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Technology and Educational Reform in Early America.

Thomas Knight Shotwell

Louisiana State University and Agricultural & Mechanical College

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IN EARLY AMERICA.**

**Louisiana State University, Ph.D., 1965
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1966

TECHNOLOGY AND EDUCATIONAL REFORM
IN EARLY AMERICA

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
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requirements for the degree of
Doctor of Philosophy

in

The Department of Vocational Agricultural Education

by

Thomas Knight Shotwell

B. S., Texas A & M University, 1955

M. Ed., Texas A & M University, 1959

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ABSTRACT

The sociological and philosophical origins of career education in agricultural and mechanical sciences have been surveyed and related to the founding of the first American institutions in which emphasis was placed on scientific technology.

In general, the study was confined to the period beginning with the close of the War of Independence and ending about 1835; however, consideration of philosophical currents was carried well into the sixteenth century. As agriculture was the predominant economic activity prior to 1850, emphasis has been given this aspect but not to the exclusion of engineering and other mechanical interests. The impact of the scientific, the French, and the American Revolutions is related to the agricultural revolution in England and in America, and to the rise of the "common man" in the philosophical backgrounds of education.

Characteristics common to the founding of the earliest schools have been discussed within the context of international communication although most of the work centers about developments within the United States. Particular details were given concerning the first half-dozen schools established, as well as information relative to their difficulties and achievements.

Consideration of the developments in chemistry, botany, and geology in so far as these influenced educational as well as agricultural practices was given. The long range influences of the interest

in "useful knowledge" and in social regeneration were evaluated and related to developments in frontier America, both from the standpoint of the new American thought in politics and of the gathering industrial revolution.

It was concluded that the rationalism of the late eighteenth century, the advances in agricultural and mechanical technology, and the new democratic view of the role of the masses in society combined to create a pedagogical climate in which a strong interest in applied science could replace much of the traditional curriculum. The educational works of Pestalozzi and Lancaster were considered within the context of American education.

Although distant, a significant relationship has been established between the early schools and the Land Grant and subsequent acts relating to vocational education in general.

Americans, unshackle your minds, and act like independent beings. You have been children long enough, subject to the control, and subservient to the interest of a haughty parent. You have now an interest of your own to augment and defend; you have an empire to raise and support by your exertions, and a national character to establish and extend by your wisdom and virtues. To effect these great objects, it is necessary to frame a liberal plan of policy, and build it on a broad system of education.

--Noah Webster

"On the Education of Youth
in America," American Museum,
September, 1792, pp. 312-13.

CHAPTER I

INTRODUCTION

Men mostly agree that the pressing problem of our century is the industrialization of undeveloped countries and the continued improvement of industrial ones. Bringing about an industrial revolution seemed at first easy; but after a few signal failures we regrouped our notes, cast new doubts on old speculations, and began to question many traditions of social and economic thought. We found the history of science wanting and began to study it anew. We found the history of technological development had been studied in a serious manner mostly during the last decade.

The study of American science has largely been done in terms of biographical sketches, many of which are not truly exhaustive. The sociology of science demands different intellectual tools than historians have commonly applied; for instance, the history of science has itself only recently come of age--in terms of the adequacy of historical studies, yes, but more importantly in the philosophical refinement with which we approached the intellectual phenomenon known as science.

Parallel advances accumulating in sociology and anthropology now reveal to us in adequate terms the cultural and academic environments expected to be conducive to the advent of a broad-based revolution. The sociologist must also be on intimate terms with all of the

sciences if he is to write a history. Such preparation is itself no small task.

American Education: The Critical Point

The formative years in American thought, the crisis in political orientation, came with the revolutionary war. As political problems eased their demands, Americans turned their energies to education, doubtless partly because education seems always to be a burning domestic issue, but largely because the new American thought demanded a new kind of American man. A society of freed men, they felt, could exist only if the great mass of the people could be raised to new levels of knowledge and learning--only if the common man could be trusted with the destiny of all men would the experiment work.

Operating on this assumption their energies were expended in two directions: (1) toward more and better traditional education in order to raise the vulgar and brutal out of their deprivation, and (2) for a different curriculum designed to give the working classes relief from the poverty, superstition, and inefficiency with which they were burdened.

Thus, the formative years in career education--other than law, medicine, and the ministry--were the years immediately following the end of hostilities over war with the motherland in 1783, and the period immediately following the War of 1812. Clearly the latter of these two periods was the more vigorous, the more nationalistic, and the more productive of pedagogic innovations. In many quarters the view is held that vocational education began with the Morrill Act or even after the twentieth century started. This study repudiates

those views and ties it with the same intellectual current which created the scientific, the French and the American revolutions.

Vocational Education and Technology

Although vocational education will not bring about the wanted industrial revolutions, it has been invariably associated with acceleration of agricultural and engineering technology and production. The education of technologists in America dates at least back to Gardiner Lyceum in 1823. The engineering education of the early years, it appears, was critical for the subsequent spurts to development which came about 1850 and thereafter. Likewise the high interest in making a science of the agricultural enterprise provided at least a goodly part of the impetus for the agricultural revolution which in turn made patent the industrial one.

Science and Technology

The fierceness with which the twentieth century pursues an understanding of science and its handmaidens is almost amusing. Were it not a truly serious undertaking, if the answers were not as illusive, if the surging effect on men were not so obvious, we could indeed smile upon the "philosopher of science." But the truth of the matter is that the Western world generated first a spark, then a torch, and now our entire existence is ablaze with science. Thus as we pursue this phenomenon with more and more urgency we must realize the stakes.

There is more here than the satisfaction of the urge for intellectual order--of the scratching of Albert Einstein's type of cryptic "itch." As it is true the boundaries of science are not yet mapped

so is it true that many ramifications are only vaguely conceived by philosophers and not at all by laymen. The study of the history of science has attracted some of the finest men of the last fifty years, and clearly, the history and philosophy of science is in its youth. Yet, this intellectual force which has become a major factor in deciding our individual and collective fate has passed beyond the understanding of even the well educated layman.

The Character of Science

We should be honest; we do not understand science. T. H. Huxley's "common sense" interpretation, though it is beautifully simple, simply will not do. Science is not an empirical study either; geometry itself is an intelligent play on axioms (one may invent all sorts of new "geometries" with different axioms). Reality is neither flat nor three dimensional as Euclid believed. There appears to be no "correct" way of describing nature or any of its manifestations. Some ways are more pleasing to men than others and hence preferable. As our estimate of what is pleasing changes so does our science. We must recognize a nature beneath (not beyond) the nature we know. Where once we lived in a substantial world of material objects, the twentieth century has cast us into a bodiless void, reality becoming a tangled web of events in space-time. And no sooner shall we become acquainted with this new uneasiness than, if we may judge from the history of science, our world will no doubt be cast into a still more encompassing form. There is no end to it. No longer is it meaningful to speak of adding to our "store" of scientific knowledge--at least not in the old sense of the term--no description of any

phenomena, no explanation of any cause or effect will be adequate for all time. And this, we should recognize, is the most remarkable scientific discovery of the century!

More pertinent to the discussion at hand is the impact of this difficult subject on the minds of men generally, not just on scientists and philosophers. The utilization of this knowledge has assuredly been a substantial force in the moulding of our industrial age and of the suburban existence for which we are to be known. More important to a great many people is the less obvious but equally important effect upon the persons involved: upon their workaday existence, upon their interests and well-being, upon their view of life and its meaningfulness to them. The unrelatedness of science and morality, of science and religion, and of the real and the abstract are simple and comfortable views which we only recently have been able to put away. We put them away not so much because we wanted to, but because we were forced, largely by this thing called science, to recognize their invalidity. J. Bronowski's book, Science and Human Values (1956), gave a great push to this view.

The reorientations which followed Planck's quantum mechanics, the organic evolution of Darwin, and relativity after Einstein, could scarcely be dismissed lightly. Although we can dismiss our ever-present political revolutions as ever present, we are confronted with the moral revolution in all its frightening proportions, and, at the same time, with some interesting new insights into a picture of orthodox religion which leaves some observers alarmed and others pleasantly warmed. The overall trend, our sociologists tell us, is toward secularization, and

if our social studies are anywhere near correct we may conclude that something less than half of the American public has anything more than a spectator interest in Protestantism, Catholicism, or any other great religion of the past.

Social Change and Adjustment

Traditionally it is said science has little direct effect on the world view of illiterates. The impact on high school graduates is usually not said to be much larger, and one would be accused of exaggeration if he should allege that all college graduates even today consciously perceive a conflict has occurred between science and Christianity. But then neither have they read Andrew D. White's two volume History of the Warfare of Science with Theology in Christendom. The great stream of direct influence, however, is felt in the colleges and universities, perhaps more in graduate work than in undergraduate. The educated man who would make sense of this tangled experience called life must somehow come to grips with the intellectual phenomena of our century and reduce the inherent incongruities wherever they are found, or perhaps, compartmentalize his mental facilities so as to avoid the conflicts. Compartmentalization seems to be the more popular.

Not everyone is capable, apparently, of the sort of mind-splitting which will let one carry on the ordinary life. For example, Samuel Butler found Darwinism a formidable idea system, as did William Jennings Bryan, Pierre Lecomte du Nouÿ, Edmund W. Sinnott, and Pierre Teilhard de Chardin--albeit for varied reasons. We may even conclude from George G. Simpson's new book This View of Life, that evolution has become and promises to continue to be the "new mysticism."

Science and the Common Man

A mistake would be made if we assume to find in learned men and their ideas the essence of the impact of scientific thought on modern man. Nothing could be more misleading. The gradual re-orientation of the world-view of humanity in the Western world clearly stems from a deeper and broader base than may be provided by these or any similar group. The movement began in the fifteenth century and broke to the surface, many would say, when Christopher Marlowe set his pen to Dr. Faustus in 1588. The change in society has been a deep and fundamental reorientation, a change in which authority is overthrown for experience, in which rationalism and skepticism shake the thrones of obedience, conformity, and faith. Still we would miss the fundamental point underlying our treatment if we recognize no indirect effect, no change in the common man, in the farmer, the mechanic, and the young men in the gray tweed suits. Contemporary society is based more on science and technology than on moral and religious attitudes: it is not the Judo-Christian heritage, not the "Age of Reason" which marks our daily lives. We are awakened each morning by technology; we catalyze breakfast and are transported to a technical job by technology; we wander about the earth and shoot at the moon with our technology. Of course, the layman does not question ecclesiastical authority nor is he much involved in abstract truth of any sort, yet compared with his medieval counterparts he is a product of metamorphism. Whether his morals are for the better or worse is debated by churchmen; nevertheless, science has wrenched human life about and set us, as a people, busily to work creating the endless gadgetry, transforming our

environments, and eagerly questioning our own character as well as the essence of this strange force. The quiet thoughts, the "secret ecstasy" of Kelper and his fellow thinkers is echoed in each new wave of human beings until today what began as a whisper is heard as an earnest shot fired at the evening star.

The earliest applications of science were made by the few men who could arrive at profound intellectual insights. The study is complicated because they used the term "natural philosophy" to describe biology, chemistry, physics, and astronomy. Equally difficult is the use of educational terminology; utilitarian science came into the curriculum under many names, the most common probably was "useful knowledge."

American Science and Technology

Of all countries to be expected as leaders in applying new knowledge to the welfare of the common man, America must be thought of as most important. For in the period 1800-1830 a vision of the future opened up--opened with such clarity that virtually every man, woman, and child could feel the excitement of participating in what they believed, with Jefferson, was the impending golden age; when armies and navies should be reduced to handling civil disturbances. As the historian Henry Adams has said, "Few men have dared to legislate as though eternal peace were at hand, in a world torn by wars and convulsions and drowned in blood; but this was what Jefferson aspired to do." It was not only a peaceful future they foresaw. Well before 1830 they knew the effect of steamboats and "iron horses," and they needed

no extra talents to measure with reasonable accuracy the potential which lay beyond the Appalachian mountains. A great many recognized science and its useful knowledge as the instrument whereby their dream might be materialized. They set about their work in no uncertain way, and, we shall see, one of the efforts was to bring to the school curriculum those changes which it was hoped would create a classless and affluent society. The "practical" education for the farmer, the mechanic, and the tradesman was at the core of the movement.

Agriculture and Engineering

Prior to 1820 the agricultural emphasis was understandably dominant. Franklin had recommended it as early as 1749 in his Proposals Relating to the Education of Youth in Pensilvania. The New England Farmer was published by Samuel Deane in 1797, and a similar treatise, The Experienced Farmer, was published in 1799 by Richard Parkinson. In addition, England was undergoing an agricultural revolution in the embrace of Arthur Young and Sir John Sinclair. The application of engineering knowledge simply did not come to America before 1815. The first engineering task of any magnitude, a canal, was begun in 1816 and finished in 1825. The first tunnel was constructed in 1831 and iron bridges became popular about 1840. The engineering emphasis added in turn to the agricultural needs by bringing the threshing machine and all sorts of edge tools about 1825. Immediately following these, come the reaper, the sewing machine, and steel plows. As C. A. and M. R. Beard so aptly noted, "It was science, not paper declarations relating to the idea of progress, that at last made

patent the practical methods by which democracy could raise the standard of living for the great masses of the people."

Even agriculture had not long been a serious topic among the élite. The first agricultural society in Germany came in 1764, in Russia in 1765, and in France there was an early agricultural society which began publishing proceedings in 1761. Before Ben Franklin, Thomas Budd had recommended a strangely technical education as early as 1685 in Good Order Established in Pennsylvania and New Jersey, a book designed to "catch the eye of emigrants."

A chair of Agriculture and Rural Economy had been established at the University of Edinburgh in 1790. The trustees of Columbia University recognized the necessity of a professorship of agriculture in 1792.

During the second half of the eighteenth century the colonies were bathed in currents of liberalism and rationalism; giving rise to "philosophical" (scientific) societies. As agriculture was the predominant economic interest, experimentation gravitated to it, but due to the intellectual character of the movement "gentlemen" farmers constituted virtually the entire field of experimenters. George Washington is noted, in addition to his farming experiments, for his proposals for a national university including agriculture as one of its basic areas. In 1794 the first proposals for a Society for the Promotion of Agriculture were projected in Philadelphia.

The Rise of Interest in Technology

Interest in technology grew rapidly after 1800. The French Revolution, the new vision of America, the rise of the "common man," the influence of Jefferson and of Jackson all effected a distillation of thought which brought "useful knowledge" to a point where pursuit of it became something of a rage. It played no small part in a landslide adult education movement begun in 1826, the American Lyceum. Already in 1831 after traveling the colonies, Alexis de Tocqueville in Democracy in America said the United States were engaged in a dangerous neglect of theoretical science: "...for if there be some nations which allow civilization to be torn from their grasp, there are others who trample it themselves under their feet."

But the situation was, of course, not quite so simple. Again the conditions of evolving thought were a little like those of the mid-sixteenth century when Agricola's De re Metallica (1556) made unusually clear the deep interaction between pure and applied science. Agricola's text was an unacademic and technical presentation on mining and metallurgy. Advances in theory became possible only after such instrument makers perfected their wares. In the seventeenth century progress moved on the basis of such ingenious instruments as Leeuwenhoek's microscope, the telescope (probably first developed by Hans Lippershey and later improved by Galileo) the thermometer, the barometer and the pendulum clock. At the end of the sixteenth century men had an itch to measure everything with precision, and by the end of the seventeenth the artisans had provided a variety of means wherewith to scratch.

The America of the nineteenth century was undertaking something on a far grander scale. It was no longer an intellectual itch that motivated the educators of 1825; and though they scarcely knew it themselves, the results of their artisan pupils' education would not lead to scratching; what they were about was a broad based industrial revolution, which, before it was over, would upend society. The mould-board plow, the reaper, the cotton gin came first in an ever-broadening line of devices and gadgets which would free an equally enlarging population to indulge more than ever before in exercising curiosity. The time necessary for saturation of the feedback possibilities between applied and pure science existing in America in 1800 has not yet been reached. Even now we continue to release more and more of our population from human drudgery. Where in 1800 farmers represented 85 per cent of the population, today each farmer feeds twenty-five non-farm people. More important, they are no longer "slaves of fear striving to avert starvation" to use McCormick's phrase. Wave after wave of rural families left their property to feed the enormous appetites of the swelling industrial age--an age which in turn excites men to study and to research.

The Problem

It is the intention of this thesis to study the educational movement centering about the period 1795-1835 in an attempt to see why and how men chose to begin the application of "useful" knowledge to the business of education. It is hoped that a general view of the philosophical and social movements leading to the production of the first generation of applied scientists (specialists) will help put our troubled "two cultures" into better perspective.

While America certainly was not alone in this effort, it is believed that this study in the sociology of science adequately demonstrates some of the reasons for the later clear and surprising superiority of America as an industrial and economic world power. The scope of the project does not allow inclusion of much detail about activity across the world, but a general outline to include something of the sources and exchanges of ideas seems merited.

Finally, it is indicative of the generally admitted inferior character of educational history that no study reasonably approximates this one. The most critical factor which led to the choice of this area has been an interest in the inter-play between pure and applied science, and between education and the industrial revolution. No doubt, part of the explanation as to why we have not chosen to study this phase of educational history lies in the scientific and social sophistication of scholarly studies of the last decade or so. Rapid advances in both sociology and the history and philosophy of science now give clear insights into scientific and educational phenomena. We may now realize the existence of an important climate of thought which affected profoundly the direction of America's, yes, of the world's development.

Definition of the Problem

The existing works in the history of science and the history of education consider the respective areas well enough but evaluate the character of the interplay between the two fields little or not at all.

The sociology of scientific education remains mostly untouched by either group of historians. How important was the effect of the early philosophical societies on agricultural education? How much of the trend for applied science in less than college grade schools originated in Europe? How important was the industrial revolution in determining the shape of school work in the early nineteenth century? To what extent can existing studies be synthesized into a more meaningful whole? Who are the men, organizations, and institutional leaders who played the more important roles in the evolution of utilitarian education prior to the Morrill Act?

Statement of Objectives

It has been the object of this study to survey the literature related to scientific and educational activities of the period 1795-1835 so as to make possible the synthesis of many existing studies producing thereby an overview of the effects of applied science on education during the time when the industrial revolution was beginning. This allows the tracing of ideas and influences to their more remote origins, with the subsequent integration of these into a meaningful pattern from which we gain new insights into American education. The waves of intellectual ferment and the gyrations in world view taking place in the minds of Americans is given consideration within the framework of frontier America. Simultaneously the developments in educational thought are related to the overall history of teaching and learning.

Outline of Research Procedure

The character of the problem demanded, first of all, a rather complete mastery of the educational ferment of the early nineteenth century. In addition, it was necessary to parallel this with an equivalent understanding of the important scientific developments. Mostly these two areas were done through a careful study of existing historical material. Dirk J. Struik's Yankee Science in the Making (first published in 1948) and B. Hindle's The Pursuit of Science in Revolutionary America (1956) constitute the bulk of the published work on the sociology of science in America for this period. A. C. True has done much work in the history of agricultural education in these early years. The detailed information on specific schools and minor movements is supplemented by research on manuscripts and papers left by such men as Robert Hallowell Gardiner, Philipp Emanuel von Fellenberg and Josiah Holbrook. Much of the important literature of the period was available in micro-print or on micro-film; some was acquired for short loans through academic libraries. There can be no doubt that much of the pertinent material has already been lost to mankind. The rural group read mostly newspapers, almanacs and pamphlets. There is no way to tell precisely how much or what kind were popular as a great many have disappeared. Though this absence of sources is a positive limitation on the study, it does not disqualify efforts at reconstruction of a reasonable picture of the period.

In America, the purely practical part of science is admirably understood, and careful attention is paid to the theoretical portion, which is immediately requisite to application. On this head, the Americans always display a clear, free, original, and inventive power of mind. But hardly anyone in the United States devotes himself to the essentially theoretical and abstract portion of human knowledge. In this respect, the Americans carry to excess a tendency which is, I think, discernible, though in a less degree, amongst all democratic nations.

--Alexis de Tocqueville
Democracy in America, 1831

CHAPTER II

THE EARLY SCIENCE

Science

As the line we draw between the sciences and the humanities is arbitrary but convenient, so is the separation of pure from applied science arbitrary but convenient. On the surface, one may assume the designation of where the ocean ends and the shore begins a simple matter. Or for another example, when, in time, does water over a flame begin to boil? Unfortunately, however, the more explicit we become about the point where sea and land divide, the more difficult becomes our problem. For there is a little soil in every sea and a little water in all the land. Likewise, as we watch the first bubbles ever so gradually forming, we are hard pressed to say precisely when the pot began to boil. But such is the character of the reality we know. We must categorize and generalize; indeed, such is the character of science.

When peering over the hopes and dreams and fears of our ancestors, we must also realize the continuity of ideas through time. Always we find the present rooted deeply into the past and the future the fruit born of today's labors. Should we step back from our closeness to the problem of separating land and sea, then does the solution become simpler, and, could we compress time in upon itself, our pot would seem to begin suddenly to boil. Because this observation is

valid--though we can scarcely find the absolute beginning of whatever it is we describe as "science"--we can meaningfully speak of the Scientific Revolution, of the Humanities, and even of Applied Science. We must not forget, however, that as we begin to approach close delineation of the subject our previously clean-cut categorizations become unmanageable. They must be crossed and crisscrossed if we are to make sense of our intellectual heritage.

Backgrounds

Emerging in the sixth or seventh millennium B. C., humanity already had a considerable store of useful knowledge. Tools, weapons, clothing, and homes were to be fashioned, and this done in addition to that most important of all innovations--settled agriculture. It is not at all difficult to trace science back into Babylonia and Egypt.¹

Further, as we follow the history of sciences up through the thirteenth and fourteenth centuries, we realize a broad energizing has taken place in the world of mundane scholarship so that by the sixteenth and seventeenth centuries a revolution in thought was being laid, a revolution which the eighteenth century would seize upon and form into a nineteenth century industrial revolution. The history of science in

¹See S. F. Mason, Main Currents of Scientific Thought (New York: Henry Schuman, 1953), "Part One," pp. 1-43.

the sixteenth, seventeenth, and eighteenth centuries has been given remarkably able treatment by Abraham Wolf.²

Applied science has, of course, been involved in the entire development of science and of scientific method, but for convenience, the term is applied in this study to designate the conscious application of abstract knowledge to improving the conditions of human life. This process began in earnest with the eighteenth century and gathered force as the nineteenth began.

Application of knowledge, both agricultural and mechanical was certainly necessary and fruitful in the irrigated fields of Egyptian farmers. It is equally true that a great store of knowledge was passed along through the generations from the earliest days on to the Dark Ages and up to the eighteenth century. This heritage of empirical information remained unchanged in its basic form and more or less unimproved until well into the Renaissance. Then as the continuing inquiries into nature accumulated a store of untapped understandings, men began to express interest in significantly expanding utilitarian knowledge for human welfare. It is for this reason as much as for any other that A. Wolf chose to describe the eighteenth century as the "Age of Humanism." "It was the century in which the knowledge acquired was

²Abraham Wolf, A History of Science, Technology and Philosophy in the Sixteenth and Seventeenth Centuries, Two volumes (New York: Harper Torchbooks, 1959) and A History of Science, Technology and Philosophy in the Eighteenth Century, Two volumes (New York: Harper Torchbooks, 1961). These four encyclopedic volumes have been used extensively in developing the historical perspective of this study. Unless otherwise noted, references to the history of science in the above periods are from Wolf's works.

made known to far wider circles than had ever been the case previously, and was applied, moreover, in every possible direction in order to improve the conditions of human life."³

Unfortunately, the results of these efforts were not great until the next century. The first American attempts at placing this pragmatic scientific knowledge in the hands of teachers and pupils was a continuation of these humanistic views. While rare incidences of instruction in home industry or agriculture appear in the eighteenth century, the greatest surge of interest came early in the nineteenth century; hence the chronological limits of this study are 1795-1835.

The Heritage from the Sixteenth and Seventeenth Centuries

An impressive case may be constructed for describing the sixteenth and seventeenth centuries as the Age of Genius. Leonardo da Vinci (1452-1519) led out with a talent strong enough to have created, almost single handed, a scientific revolution, but Florence was not ready for him. Nicolaus Copernicus (1473-1543), Galileo Galilei (1564-1642) and Sir Isaac Newton (1642-1727) together precipitated decided changes in the entire field of letters. Georgius Agricola (1494-1555), a doctor who turned to mining and mechanics, wrote a pivotal treatise consisting of twelve books covering every aspect of the mining industry and its associated metallurgical processes.

³A History of Science, Technology and Philosophy in the Eighteenth Century, op. cit., p. 27.

This was the epoch of Sir Francis Bacon (1561-1626), of the ill-fated pantheist Giordano Bruno (1548-1600); and as if this were not enough, we must add the names of Rene Descartes (1596-1650), Andreas Vesalius (1514-1564), Antonius Leeuwenhoek (1632-1723), Robert Hooke (1635-1703), Gottfried Wilhelm Leibniz (1646-1716), and Tycho Brahe (1546-1601). Where would one today find such an array of talent! We must not overlook the great Benedictus de Spinoza (1632-77) or John Locke (1632-1704).

In the field of agriculture Jethro Tull (1674-1741) along with Charles Townshend (1674-1738) made the only significant contributions. Much development in agricultural science was reserved for the nineteenth century.

The Royal Society of London, probably deliberately and consciously created because of Francis Bacon's writings, was founded about 1645 as the first scientific organization. The French Academie des Sciences was organized in 1666 and, after two attempts, the Berlin Academy was founded in 1700. Discoveries were made both within and outside of these organizations. The most significant were the microscope, the telescope, marked advances in mathematics, the discovery of the circulation of blood by Harvey, Newton's works generally, and the Copernican view of a helio-centric solar system. Descartes contributed mightily with his Discourse on Method (1637), and Spinoza and Bruno championed the pantheists' view that all nature is God and god is all Nature. Both men were living dangerously, the latter being burned at the stake by the Inquisition in 1600.

Significant advances made in chemistry and mechanics were dwarfed by the proportions of similar developments in the eighteenth and nineteenth centuries. The single most significant technological advance of the seventeenth century was the stationary steam engine. Calculating devices also made a beginning.

No doubt the most creative field was philosophy; the five major divisions around which philosophical efforts center today were laid clearly before the world: the Materialism of Hobbes, the Empiricism of Locke, the Pantheism of Spinoza, the Idealism of Leibniz, and the Dualism of Descartes. So as the seventeenth century closed, we are tempted to say one era came to an end and another began. But that would not make it so. Most of the developments of the eighteenth century were already well underway long before the numbers rounded out to zeros again.

Science in the Eighteenth Century

We find difficulty, peering backward into our own youth, in fixing a specific year in which we as individuals changed from the unconscious animalistic organism into an aware conscious self. The roots of individual identity and of intellectual perception which distinguish us humans acutely from our nearest living relatives have their origin in the dim distant past. Equal difficulty is encountered when one attempts to make explicit statements about similar gradual changes in mankind today. We must, nevertheless, recognize such changes do occur and therewith take care not to underestimate their importance. If during the sixteenth and seventeenth centuries we may say man became

aware of himself, then the eighteenth century saw him engage his frightfully powerful intellect in a broad based study of the natural world, and in loosening the various ties on his freedom.

The turn of the century was greeted by six year old Francois Marie Arouet (Voltaire), perhaps the most incomparable infidel of all time, and by a twelve year old boy suffering from infantile paralysis-- Alexander Pope--who was to become one of the greatest English poets. The century greeted Ben Franklin in 1706, and back across the seas, Carl Linnaeus in 1707. Other important men born within the first half of the eighteenth century include Jean Jacques Rousseau (1712), Immanuel Kant (1724), Adam Smith (1723), Thomas Paine (1737), Joseph Priestley (1733), George Washington (1732) and both Thomas Jefferson and Antoine Lavoisier (in 1743).

Although Johann Wolfgang von Goethe was born near mid-century, the swing of his mighty intellect would have a significant effect on civilization even before the nineteenth century could begin.

By no means an exhaustive listing of the genius of the eighteenth century, perhaps the discussion here will serve to give the reader some substantial footing for the history which follows. The birth of the "Enlightenment" is generally ascribed to seventeenth century England. During the eighteenth century the spirit of humanism and of rationalism ordered an unprecedented spread of knowledge beyond the narrow circles of the learned. The middle and upper classes, although they represented a small segment of the total population, enjoyed the new literature immensely. Still, although books were generally available, the working class could scarcely enjoy what they had not been taught to read.

Clearly a certain malice toward the lower classes existed on the part of most leaders of the Enlightenment. While Rousseau and his followers felt man was quite all right without education, the great majority were openly afraid of the results of a general enlightenment. Ignorance and religion, they thought, was all that kept the vulgar and the brutal in their places. This is precisely what motivated the perceptive Voltaire to remark "If there were no God, we should have to invent one." Honoré Gabriel Riqueti Mirabeau (1749-91), Adam Smith (1723-1790) and Benjamin Thompson (Count Rumford) (1753-1814) proclaimed, albeit rather unsuccessfully, the need for the education of the poor, making themselves thereby exceptions to the thinking of the majority.

With this prevailing attitude toward the masses, any proposal for significant education of the working man was simply out of step with the dominant spirit of the age. It is true that the poor and oppressed were being championed on every hand, but we must distinguish between giving people relief and in giving people knowledge. Vocational education would have a long wait; a free liberal education for the masses would wait longer.

Scientific Progress

During the eighteenth century mathematics was extended, systematized, and better integrated into mechanics, physics, and astronomy. Electricity, magnetism, and chemistry made great strides on all fronts. Biologists were busily studying anatomy and taxonomy. Medicine improved only a little, but the study of human anatomy and physiology made nice progress.

Psychology was the favorite study of the century: witness Alexander Pope's famous "the proper study of mankind is man"; philosophy was taking up the scattered ends of the racy seventeenth century.

In agriculture the "gentleman" farmer was an emphasis which took no small part of its origin from Roman agrarianism. By the end of the century agrarianism was all the rage. Although neither much new information nor many inventions were made on behalf of agriculture, the existing knowledge was systematized and dispersed as never before. Societies for promoting agrarian interests sprang up all over Europe and America as the century drew to a close. A spirit of experimentation thoroughly permeated the field of agriculture and a "science of agriculture" based on experimental results was firmly established, although a great deal was still to be learned by continued empirical observations of crop rotations, fallow procedures, and fertilizer usage.

Inventions of note include some lightweight plows, all iron plows, and seed drills to replace manual planting. Further, reapers for cutting small grains, and threshers for removing the stalks and chaff were being used, but on a quite limited scale.

Technology made important advances on every hand. In machines for weaving, for power conversion, for building construction, and for transportation the advances are breath-taking. Every sort of device was tried in the great effort to short-cut the world's work. Spring devices, new building techniques, new bridges of iron, new wagons for transport, and improvements in road building and steam engine construction were made. A. Wolf, in his history of eighteenth

century science, devotes some one hundred and sixty pages to the fervent activities of technology. And the significance of this broad activity must not be overlooked. For by the end of the century the industrial revolution was fully launched--there could be no turning back.

The American and French Revolutions

If we would at all understand the eighteenth century we must understand that it brought about the American and French revolutions. The most pertinent observation for education was that the contemptuous attitude popularly held toward the lower classes was largely crippled by these two cataclysmic upheavals. No educated person living during the revolution could escape the social and political implications; a great many men were profoundly influenced in their life's work by what they saw as the apparent failure of the French Revolution. Only a start has been made when we say the French Revolution was fought for Liberté, Egalité, Fraternité. Well-known forces were responsible for this frightening series of crises in France.

Central among the problems leading to unrest before the French Revolution began in 1787 were the corruptness and authoritativeness of the ancien régime, the economic plight of workers, extremely heavy taxation by the state and by the Holy Roman Empire, and the intellectual ferment of the Age of Enlightenment.

The revolutions triggered an equally vast complex of cascading consequences. Adequate treatment cannot be given here; however, some space has been given in subsequent discussions which deal with forces

affecting the decisions of individuals who were involved in the founding of the various early institutions of applied science. The aura of respectability given to champions of the worker, the loosening of religious bonds, and the personal resolution precipitated by both revolutions were all exactly calculated to induce trial attempts at education which would put the fruits of science into the productive hands of the people.

Thus each thing extends itself and pushes its roots into the past, ever farther back, by that which makes it most itself. Everything, in some extremely attenuated extension of itself, has existed from the very first. Nothing can be done in a direct way to counter this basic condition of our knowledge. Critical points have been reached, rungs on the ladder, involving a change of state--jumps of all sorts in the course of development. Henceforward this is the only way in which science can speak of a "first instance." But it is none the less a true way. In every domain, when anything exceeds a certain measurement, it suddenly changes its aspect, condition or nature. The curve doubles back, the surface contracts to a point, the solid disintegrates, the liquid boils, the germ cell divides, intuition suddenly bursts on the piled up facts....

--Pierre Teilhard de Chardin
The Phenomenon of Man, 1956
(Translated into English, 1959)

CHAPTER III

SOME BACKGROUNDS OF TECHNOLOGY IN EDUCATION

Human institutions, it is said, go through distinct transitions on their way to achievement. The speed with which these transitions are accomplished is related both to the ideological environment and to the inherent nature of the institution. The three stages in applied scientific education appear to be (1) conceptualization, (2) demonstration, and (3) realization.¹ The first of these is achieved by utopian novelists and philosophers as they visualize, from the elements of experience, the possibilities inherent in man. The second is recognizable as the work of experimenters such as Fellenberg, and the third consists of a widespread general establishment within society.

More, Rabelais, Leibnitz

As early as 1516, Sir Thomas More, reflecting the aspirations of the sixteenth century, wrote his Utopia, a book immediately successful and translated into English in 1551. The novel reflected, among other things, a rather premature Deism and vocational education not only for youth, but continuing for adults as well.

¹See also the three stages described by Lewis Flint Anderson, History of Manual and Industrial School Education (New York: D. Appleton and Company, 1926), p. 6.

More spoke in clear and certain terms about the education of his people:

For the most part every man is brought up in his father's craft....But if a man's mind stand to any other, he is by adoption put into a family of that occupation which he doth most fantasy.... Yea, and if any person, when he hath learned one craft, be desirous to learn also another, he is likewise suffered and permitted.²

This simple apprenticeship educational plan was to be augmented by daily educational lectures to be held "early in the morning" for all the residents of Utopia. While More is not explicit about the training of children in formal school situations, his adult program definitely appears as a matter of great importance to Utopia. In his attitude toward utilitarian science More is explicit enough:

Husbandry is a science common to them all /the inhabitants of Utopia/ in general, both men and women, wherein they be all expert and cunning. In this they be all instruct even from their youth; partly in schools with traditions and precepts, and partly in the country nigh the city.... Besides husbandry...every one of them learneth one or several particular sciences as his own proper craft. That is most commonly either cloth-working in wool or flax, or masonry, or the smith's craft, or the carpenter's science....³

The ease with which the author draws up his ideal world of the early sixteenth century is a little disturbing to us. More's dreams

²Sir Thomas More, Utopia (New York: The Heritage Press, 1935), p. 74.

³Ibid., p. 73.

have in fact rather been realized by modern society--better religious freedom coupled with economic emancipation achieved through vocational and professional education. Perhaps A. N. Whitehead was too pessimistic when he said the amount of time necessary for a new idea to be instituted into society was 2000 years. We have come near More's utopia in only three and one-half centuries!

Even before More's work was translated into English the French satirist Francois Rabelais published the immortal works Gargantua and Pantagruel (1532) in which he behooves the student to familiarize himself with the industries. As one might conjecture, it was scarcely possible for Rabelais to overlook the vocational aspects of education since his was a lively interest in this world in contrast to the popular religious view of his day.

Another example of the early conceptualization stage is to be recognized in Gottfried Wilhelm Leibnitz's Project de l'education d'un prince (1693). This too was a part of the rationalism and humanism which, by its nature, emphasizes the more pragmatic aspects of the sciences. Leibnitz spoke of great injury and losses to the state due to the entirely literary character of education, generally extolled the practical benefits of education, and played a pivotal part in securing the founding of the Society of Sciences at Berlin in 1700. Here the bridge between the first and second stages, between conceptualization and demonstration, appears to have occurred. That so few reports of activities in secular education have been passed on to us is perhaps attributable to the fact that the religious character of education in these years mitigated strongly against a vocational emphasis, thereby

making achievements less likely to be recorded. We do have at least one important record of a village of the Dauphin, France, where from 1725 to 1745 pupils were "initiated according to their tastes, ages, and dispositions, into different kinds of industrial, as well as agricultural work."⁴

Budd and Franklin

The seething, restless, racy American nation with all its political and religious liberality could scarcely fail to pick up the idea. As early as 1685, Thomas Budd published his Good Order Established in Pennsylvania and New Jersey in which he speaks forthrightly of public vocational education through seven grades "or longer, if the Parents please."⁵ Schools were to be provided in all towns and cities where "persons of known honesty, skill and understanding" were to be yearly chosen to instruct boys and girls "in the most useful Arts and Sciences that they in their youthful capacities may be capable to understand...."

The Boys to be taught and instructed in some Mystery or Trade, as the making of Mathematical Instruments; Joynery, Turnery, the making of Clocks and Watches, Weaving, Shoe-making....

Girls were to receive a similar training in "Spinning of Flax and Wool, and Knitting of Gloves and Stockings, Sewing, and making of all sorts

⁴Report of the Royal Commissioners On Technical Instruction (London, 1882), p. 37; quoted in Education, IV (1884), 502.

⁵Thomas Budd, Good Order Established in Pennsylvania and New Jersey (Cleveland: The Burrows Brothers Company, 1902, reprint), pp. 43-44. The original edition was published in 1685 by William Bradford of Philadelphia and is now rare.

of useful Needle-Work, and the making of Straw-Work, as Hats, Baskets, etc. or any other useful Art or Mystery that the School is capable of teaching."

With his usual resourcefulness, Benjamin Franklin stepped into the situation, lending it his discerning hand. Having read widely, he expressed the progressive attitude toward utilitarian education as did most men of the Renaissance. In a comment on agricultural education Franklin suggests:

While they are reading Natural History, might not a little Gardening, Planting, Grafting, Inoculating, etc. be taught and practiced; and now and then Excursions made to the neighboring Plantations of the best Farmers, their Methods observ'd and reason'd upon for the Improvement of Youth. The Improvement of Agriculture being useful to all and Skill in it no Disparagement to any.⁶

Fortunately, Franklin is specific about his sources. He notes "Milton would have the Latin Authors on Agriculture taught at School, as Cato, Varro, and Columella;...." Milton's reasons for such study are to enable them "to improve the Tillage of their Country, to recover the bad Soil, and to remedy the Waste that is made of Good...."

Franklin notices also that Francis Hutcheson (1694-1746) has said

Nor should I think it below the Dignity or Regard of an University, to descend even to the general Precepts of Agriculture and Gardening. Virgil, Varro and others eminent in Learning tho't it not below their Pen-----and why should we think meanly of that Art, which was the Mother of Heroes, and of the Masters of the World.

⁶Benjamin Franklin, Proposals Relating to the Education of Youth in Pensilvania (Philadelphia, 1749), pp. 27-28.

Locke, Franklin says, recommends "the Study of Husbandry and Gardening, as well as gaining an insight in several of the manual Arts."

Overall, Franklin's essay is a prime example of the great man's commanding intellectual posture. A. F. Tyler commented that the pamphlet "reads like the prospectus of a progressive school of the twentieth century."⁷ And this is no exaggeration! This is one of the earliest, if not the earliest, assertions that "learning comes by doing"--a phrase almost synonymous with vocational education for a few years.

Franklin was not without misgivings about his bold theorizings. His brief statements concerning useful educational pursuits are documented with an extended list of references lest he be considered shallow. But he was not alone in America in feeling the need for education in agriculture and the industries.

Columbia University's Program

Columbia University (then King's College) mentioned the need for an agricultural subject in the collegiate curriculum in 1754. In 1792 funds were granted for a professorship in agriculture by the New York legislature. Also in sympathy with Franklin's views was William Smith whose pamphlet General Idea of the College of Mirania written in 1756 went quite as far as did Franklin's. Smith is reported to have carried his pragmatic curriculum to Colonial College in 1756, to Washington College, Md., in 1782, and Madison carried it to the College of

⁷Freedom's Ferment: Phases of American Social History to 1860 (Minneapolis: University of Minnesota Press, 1944), p. 229.

William and Mary in 1776. Lewis F. Snow concludes that Smith's plan gave definite form to the American college course.⁸

The Agricultural Emphasis

An early society of agriculturalists published proceedings in France in 1761. In Germany a similar organization began in 1764, and one in Russia in 1765. By 1769 the Royal Agricultural Society of Denmark was instituted as an apprentice system for farmers' sons. Shortly thereafter (1773) in a model school at Kaplitz in Bohemia, Kinderman taught his pupils "how to occupy a portion of their own time and that of their older pupils, in and out of school hours, in such in-door industries as knitting, sewing, wool carding, and spinning, and out-of-door work as kitchen gardening, culture of trees, and raising silkworms." Interestingly enough, Kinderman supervised 54 schools containing 2,644 pupils in which the aim was "to give the future citizen an instruction adapted to his special occupation."⁹

In 1775 Abbe Rosier proposed to Turgot, at the time Minister of French Finance, "A Plan for a National School of Agriculture." When nothing came of the proposal, he later submitted it to Napoleon--all with the same negative result.¹⁰

⁸The College Curriculum in the United States (New York: Columbia University, 1907), pp. 61-66.

⁹Henry Barnard, ed., "Special Instruction in Austria," The American Journal of Education, IV (1870), 35.

¹⁰Elwood P. Cubberly, The History of Education (New York: Houghton Mifflin, 1920), pp. 800-801.

By 1791 an agricultural school was opened at Tírnova in Bohemia. In Hungary agricultural schools were begun at Zarvas in 1779, at Mgy-Micklos in 1786, and the Georgicon Academy at Kezthely founded in 1797 was long the "model agricultural college of Europe."¹¹

In America the subject of promoting agriculture and its teaching was resumed as the War of Independence came to a close. The Philadelphia Society for Promoting Agriculture first met on February 11, 1785, and a South Carolina group followed their example organizing on August 24th of the same year.

Back in England, the University of Edinburgh established a "Chair of Agriculture and Rural Economy" in 1790. The nearest American equivalent was the Erving professorship in chemistry at Harvard in 1783, and the appointment of Benjamin Silliman to a like position at Yale in 1802--neither position being an emphasis on agricultural science, but rather on chemistry generally--including agricultural chemistry in a sense not at all to be found in the modern usage of the word "chemistry."

In the United States a well-known M. D., Benjamin Rush, presented a definite plan for a national university in the fall of 1786.¹² This plan included a separate department as such, but enthusiasm for a

¹¹A. C. True, A History of Agricultural Education in the United States, 1785-1925, USDA Misc. Pub. No. 36, 1929, pp. 3-4.

¹²A Plan for the Establishment of Public Schools and the Diffusion of Knowledge in Pennsylvania; Addressed to the Legislature and Citizens of the State (Philadelphia: Printed for Thomas Dobson, 1786), 36 pp.

national university was not strong enough to activate the plans. Jefferson's University of Virginia had some teaching of scientific agriculture but only as a subunit of the chemistry department. We must not overlook, also, that Jefferson's school for "farmers' sons" was distinctly professional rather than vocational--even though the lines between the two are always difficult to draw. In fact, most of the talk of agricultural education at this time was idealistically directed toward providing for farmers to become men of letters as well as providing them with the elements of sound agriculture.

Several societies began offering premiums for accomplishments in the fields of agriculture and mechanics, some as early as 1787.¹³ By 1794 the Philadelphia Society had appointed a committee to prepare outlines of a plan for establishing a state society for the promotion of agriculture "...connecting it with the education of youth in the knowledge of that most important art while they are acquiring other useful knowledge suitable for the agricultural citizens of the state"¹⁴ It is interesting to note that this is also the same year when in France the most precocious chemist to contribute to man's knowledge of plant physiology was carted off and guillotined on May 5th. Men pay a high price for revolutions.

Foundations and Endowments

When Washington became president in 1789, there were no scientific foundations within the American Republic save the American

¹³American Museum, II, No. IV (1787), pp. 355-356 and No. V (1787), pp. 307-308.

¹⁴Philadelphia Society for the Promotion of Agriculture, Memoirs, VI (1939), p. 12.

Philosophical Society, the American Academy in Boston, Bartram's Botanic Garden, the private observatory of Rittenhouse and Peale's Natural History Museum in Philadelphia. Washington, Franklin, and Jefferson constituted a political trinity steeped in utilitarian science. All were fellows of the American Philosophical Society and active in its programs.

The brief, confusing administration of John Adams yielded little of scientific importance, although it might have done so had conditions of political strife abated. The next president to eagerly engage the sciences was John Quincy Adams who served from 1825 to 1829. Adams prized the presidency of the American Academy of Arts and Sciences above the presidency of the nation. He also revived, unsuccessfully, Washington's and Rush's project for a national university.¹⁵

Meanwhile, Count Rumford was seeing to the establishment of the Royal Institute of Great Britain in 1800 for "the application of science to the common purposes of life." Upon his death in 1814, his will was found to stipulate money for a chair at Harvard for instruction in "the application of the sciences to the useful arts." This constituted the first successful attempt to unite the academic and useful branches of science--particularly to unite professors with self-made inventors.

¹⁵For an excellent treatment of the political influences on education in early America see G. Brown Goode, "The Origin of the National Scientific and Educational Institutions of the United States," Papers of the American Historical Society, IV, Part 2 (1890), pp. 93-202.

The Educational "Plans" of Revolutionary America

As in all wars, not nearly all of those who participated in the American Revolution were reasonably aware of the principles for which they agreed to die. Yet more Americans probably knew the revolutionary principles of their fight than in any war fought before that time. As a brief reminder we may summarize these as follows:

- (1) The necessity of separation from England.
- (2) The "Natural" basis of social organization.
- (3) The rights of life, liberty, and happiness are inalienable.
- (4) Government of the people to be by the people.
- (5) All institutions, all men, subject to continued improvement through their being mutable and perfectable.

Following in line with the "government by the people" was a complete dedication to the proposition that the common man was to be well educated. Thus when the new government could be put on a working basis, the founding fathers began to earnestly concern themselves with public education. From 1784 to 1800 a serious discussion of education pervaded the newly independent colonies. Since the principles of the revolution made popular and "useful" education into an important political issue, most writers on political subjects had specific remarks to make on education. Noah Webster and Richard Price are two examples of important influences in developing a nationalistic and scientific taste in American education.¹⁶

¹⁶See A. O. Hansen, Liberalism and American Education in the Eighteenth Century (New York: Macmillan Co., 1926), pp. 200-63.

Benjamin Rush's writings of 1798 made a clear plea for dropping Greek and Latin and incorporating in their place science. "Natural history...is the foundation of all useful and practical knowledge in agriculture, manufactures, and commerce, as well as in philosophy, chemistry, and medicine...."¹⁷ "The rejection of the Latin and Greek languages from our schools, would produce a revolution in science, and in human affairs."¹⁸ In addition, it would have a "tendency to destroy the prejudices of the common people against schools and colleges."¹⁹

Far reaching, humanistic plans of universal utilitarian education for the public were prepared and published by James Sullivan in 1788, Robert Coram in 1791, and Nathaniel Chipman in 1793. In 1797 Samuel Knox and Lafitte du Courteil both wrote significant treatments in popular education. In 1798, a treatise by Samuel H. Smith and the one written by Samuel Knox in 1797 were each awarded a premium of fifty dollars and ordered to be published by the American Philosophical Society.

Thomas Jefferson's request of Du Pont de Nemours was honored in 1800 when the latter published National Education in the United States of America. That it was not translated into English until 1923 is of little consequence since most of the intellectual leaders of the new republic readily comprehended the French.

¹⁷Benjamin Rush, Essays: Literary, Moral and Philosophical (Philadelphia, 1798), p. 47.

¹⁸Ibid., p. 39.

¹⁹Ibid., p. 43.

When, in 1800, it seemed likely that these discussions would soon produce results, the excesses of the French Revolution took away the initiative, the cutting edge, of intellectual respectability in championing pragmatism and the common man. Their faith in the great possibilities latent in the mass of uneducated people was shaken, and their ability to effectively engage society, and particularly the legislatures, in a long range revolutionary view of society was significantly reduced. After a few years of discussion and observation their energies were again marshalled into attempts such as resulted in the individual schools presented in subsequent chapters of this study--Gardiner Lyceum, Rensselaer School, the Manual Labor Movement--and ultimately, the Land-Grant and other acts.

The "plans" of Rush, Coram, Sullivan, Chipman, Knox, Smith, Courteil, and Nemours are individually discussed and carefully evaluated in Allen Oscar Hansen's Liberalism and American Education in the Eighteenth Century (1926), a text neglected by educational historians generally.

The American Dream

By 1817 every serious problem which faced the Union before 1800 had been removed or neutralized. Society turned to examine its possibilities and to inventory its holdings. The differences between Europe and America were remarkably clear. In religious, literary, and scientific directions, and perhaps more so in political directions, America was decidedly revolutionary. The entire destiny of the United States seemed to hinge around the validity of the rather questionable

assumption that the average man was to be lifted upon an intellectual and social level of the highest type. Henry Adams stated the situation well enough:

The destinies of the United States were certainly staked, without reserve or escape, on the soundness of this doubtful and even improbable principle, ignoring or over-throwing the institutions of Church, aristocracy, family, army, and political intervention, which long experience had shown to be needed for the safety of Society. Europe might be right in thinking that without such safeguards society must come to an end; but even Europeans must concede that there was a chance, if no greater than one in a thousand, that America might, at least for a time, succeed. ...If the average human being could accustom himself to reason with the logical processes of Descartes and Newton! --What then?²⁰

²⁰ Henry Adams, The Formative Years (Boston: Houghton Mifflin Co., 1947), I, p. 82.

In a country like ours the subject under consideration is peculiarly important. We have a wide extent of uncultivated land, possessed of a strong and fertile soil. Yet Agriculture (though improving) is still in its infancy, and calls for the assistance of all her professed friends. It is a science, a complete knowledge of which, depends on a series of actual experiments, and therefore must progress with time.

--Edmund Foster

In an oration delivered
before the Western Society
of Middlesex Husbandmen.
October, 1799

CHAPTER IV

AGRICULTURAL SCIENCE

The value of experimentation was not overlooked by early American agrarians. The spirit of scientific inquiry by field test was certainly well-known to George Washington. Already in 1801 the correspondence between Arthur Young (1741-1820) and Washington had been published in London.¹ Both men have earned positions of considerable notice for their exertions in behalf of agriculture. Washington's Mount Vernon farm is known to almost every American school boy. Young remains one of the greatest benefactors of agriculture. His Annals of Agriculture ("and other useful arts") stressed utility and was published annually from 1784 to 1815. Young's works are almost entirely confined to farming, "practical and political" and he is said to have written some 250 volumes over a writing career of about fifty years.² By his writings, he, more than anyone else, helped raise agriculture to a science.

¹Letters From His Excellency George Washington, To Arthur Young, Esq. Containing an Account of His Husbandry, With a Map of His Farm; His Opinions on Various Questions in Agriculture; And Many Particulars of the Rural Economy of the United States (London: B. McMillan, 1801).

²G. E. Fussell, More Old English Farming Books (London: Crosby, Lockwood and Sons, Ltd., 1950), p. 70. For a list of Young's publications see Library of Literary Criticism, 1785-1824, Charles W. Moulton, ed. (Buffalo, New York: Moulton Publishing Co., 1902), p. 654.

Sir John Sinclair (1754-1835) began work on a handbook of agriculture in 1790. It was to be a "Manual, or handbook" of agriculture. Somewhat over one thousand persons are said to have contributed to what surely was a monumental task of separating the chaff from the grain in so varied a field of thought. Sinclair was first president of the Board of Agriculture in Scotland, and later he was associated with the English Board of Agriculture. His handbook, completed in 1817 and entitled The Code of Agriculture, went through five editions by 1832 and has probably earned the title of the "First Agricultural Textbook."³

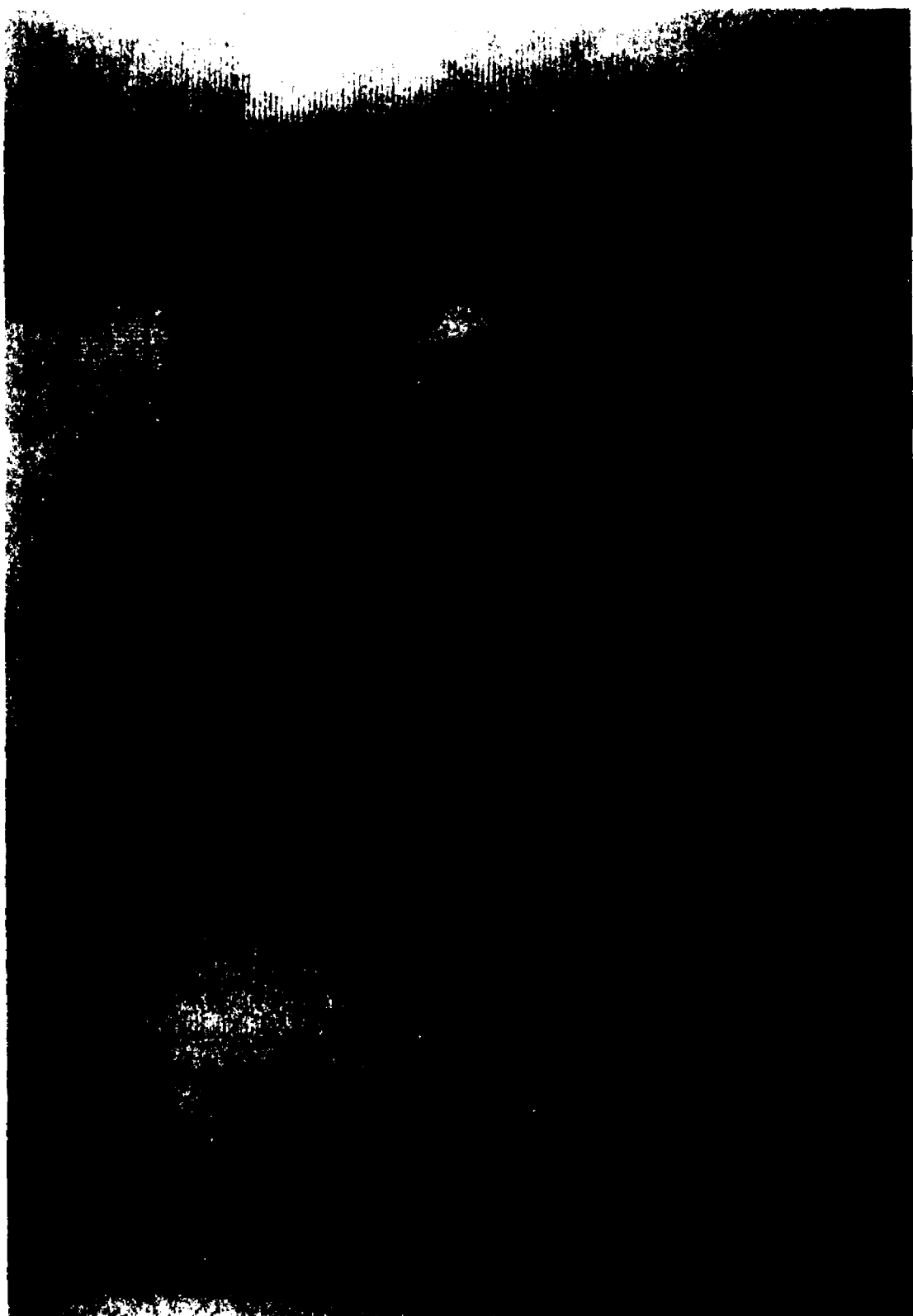
The book was quickly lauded by American agriculture; editor John S. Skinner of the American Farmer early proposed to put it into an American edition with notes peculiar to our circumstances. Many books on agriculture were available in 1820 but none was suitable for general use in teaching below the college level. The first "Agricultural Reader" appeared in Boston in 1824.⁴

Sir Humphrey Davy and Other Agricultural Scientists

The lectures of Sir Humphrey Davy (1778-1829) came to America when published as the Elements of Agricultural Chemistry in 1813. Liebig's first English translation appeared in 1840 but this fact does not preclude its having had an effect on the agrarian gentry of an

³Sir John Sinclair, bart., The Code of Agriculture; Including Observations on Gardens, Orchards, Woods, and Plantations; With an Account of all the Recent Improvements in the Management of Arable and Grass Lands (London: Sherwood, Gilbert and Piper, 1817).

⁴A. C. True, "Report of the Bibliographer," Proceedings, XXI (1907), p. 18.



1. Sir John Sinclair, author of the important text, The Code of Agriculture, 1817. (From the frontispiece.)

THE
C O D E
OF
AGRICULTURE;

INCLUDING
OBSERVATIONS ON GARDENS, ORCHARDS, WOODS,
AND PLANTATIONS.

BY
THE RIGHT HONOURABLE
SIR JOHN SINCLAIR, BART.
FOUNDER OF THE BOARD OF AGRICULTURE.

Omnium rerum ex quibus aliquid acquiritur, nihil est Agricultura melius,
nihil uberius, nihil dulcius, nihil homine libero dignius.

CICERO DE OFFIC. 1, c. 42.

LONDON:

PRINTED FOR SHERWOOD, NEELY AND JONES, PATERNOSTER-
ROW; ARCHIBALD CONSTABLE AND CO. EDINBURGH;
M. KEENE, DUBLIN; TODD, YORK; AND
BARRETT AND SON, BATH:

By B. M'Millan, Dow-Street, Covent-Garden

1817.

2. Title page to The Code of Agriculture, first edition.



3. Agricultural inquiries demonstrated as an empirical pyramid.
(From the Code of Agriculture, fifth edition.)

earlier period. The American Farmer, a weekly octavo news appeared in 1819 under the editorship of John S. Skinner and The New England Farmer began publishing three years later under the editorship of Thomas G. Fessenden. Samuel Deane's book The New England Farmer was the first good American treatise of agriculture. Deane wrote both from personal experience and from a study of English and French writings. His work was encouraged by the American Academy of Massachusetts who recommended it "to the Publick as deserving their Encouragement and Subscription." The only American work of any consequence to precede Deane's book was Essays upon Field Husbandry in New England and Other Papers, 1748-1762 which was first published in 1760.⁵ Deane later became president of Bowdoin College.

Thomas Jefferson's "Catalogue for an Agricultural Library," distinctly international in scope, was published in 1820 by the American Farmer.⁶ In 1827 the American Farmer published a list of titles of an all-English agricultural library compiled by James Mease. It consisted of twelve titles and twenty-two volumes.⁷

This picture of intelligence and scholarship can be misleading. We must recognize that all was not well with American agriculture. In addition to depressions, revolutions and Indian wars, the farm of 1800 was anything but paradise. Fifty or a hundred miles inland most houses

⁵See the work edited by Harry J. Carman and Rexford G. Tugwell (New York, 1934).

⁶American Farmer, II (1820), 93-94.

⁷American Farmer, VIII (1827), 402-403.

were log cabins, not nearly all of which boasted a glass window. In describing the situation, historian Henry Adams made a comparison of eighth with eighteenth century farmers, saying of the former,

...neither their houses, their clothing, their food and drink, their agricultural tools and methods, their stock, nor their habits were so greatly altered or improved by time that they would have found much difficulty in accommodating their lives to that of their descendants in the eighteenth century. ... Enterprising gentlemen-farmers introduced threshing-machines⁸ and invented scientific plows; but these were novelties.

Enough records exist for us to know that most farmers were unbelievably superstitious,⁹ rebellious at "book-learning,"¹⁰ and that they allowed the stock to run loose until heavy frosts brought them near death--on the pretense of hardening them for the winter. Only among the gentlemen farmers were crop rotation, fertilization and drainage common. In an editorial in 1819, Skinner warned that agriculture might again be typified by "...an old-fashioned, imported coach, drawn by two half-starved horses, driven by a naked negro slave, conveying a live hog, to buy a jug of rum."¹¹

Some Problems

There were other reasons for misgivings in 1820. Noah Webster admitted that "our learning is superficial in a shameful degree,

⁸Henry Adams, The Formative Years (Boston: Houghton Mifflin Company, 1947), p. 11.

⁹Stevenson Whitcomb Fletcher, Pennsylvania Agriculture and Country Life, 1640-1840 (Harrisburg: Pennsylvania Historical and Museum Commission, 1950), pp. 340-343.

¹⁰American Farmer, IX (1827), 74.

¹¹American Farmer, I (1819), 69.

...our colleges are disgracefully destitute of books and philosophical apparatus, ...and I am ashamed to own that scarcely a branch of science can be fully investigated in America for want of books, especially original works."¹²

The historians John D. Hicks and George E. Mowry attribute the stifling of every creative impulse primarily to the "blight of Calvinistic theology" which assured mankind of its total depravity and its helplessness.¹³ Ralph Waldo Emerson remarked "from 1790 to 1820 there was not a book, a speech, a conversation or a thought." And as late as 1841, an unusually sensitive and intelligent Francis Lieber wrote from South Carolina,

You can scarcely imagine with what longings I look for the arrival of a vessel which is to bring me new publications from Europe.... I live at the South, it is true, but with respect to culture and intellectual life, and all a man requires who takes part in the stirring movements of our times, I might as well be in Siberia.¹⁴

But this is exaggeration.

As Washington took office as president, the American Academy (Boston), the American Philosophical Society, Bartram's Botanic Garden, the Rittenhouse observatory, and Peale's Natural History Museum (Philadelphia) were already existing scientific foundations. Jefferson,

¹²Quoted by Henry Adams, op. cit., p. 32.

¹³John D. Hicks and George E. Mowry, A Short History of American Democracy (Boston: Houghton Mifflin Co., 1956), p. 246.

¹⁴Quoted by Charles F. Thwing, A History of Higher Education in America (New York: D. Appleton Century Co., 1906), p. 242.

Franklin, and Washington were Fellows of the American Philosophical Society. Discussions of the utilitarian character of scientific knowledge became all the rage, and, of course, no subject was more important than agriculture in pre-industrial America.

Jefferson studied the literature, designed an improved mould-board plow, and worked at contour farming on the mountain side at Monticello; but farmers in general did not demonstrate such rationality for another century. The most significant development took place in the field of rural papers of the period 1820-1835. As already noted, the American Farmer was begun by John Skinner, a lawyer, in 1819, and the New England Farmer by Thomas G. Fessenden in 1822 at Boston. In addition, The Massachusetts Agricultural Repository (Boston) and The New York Farmer and Horticultural Repository were both begun in 1828. In 1831 The Genesee Farmer began at Rochester and in 1833 both the Maine Farmer (Winthrop and Hallowell) and the New York Farmer (N.Y.) began publication. Almost belatedly, Jesse Buel began The Cultivator at Albany in 1834. Prior to these there was little agricultural literature in the States other than a few calendars, almanacs and isolated tracts on specific subjects.

The dirt farmer in America was nevertheless self-sustaining and well-established in 1820. The census of that year showed that 2,070,646 persons of a total population of 9,637,999 were engaged in agricultural pursuits. During the period 1815 and 1835 a change of orientation occurred. Farmers, although a little reluctantly, left off their subsistence farming and began to work for profit. This change, apparently a product of the expanding industrial

revolution, has received treatment by Percy W. Bidwell.¹⁵ Yet, while farmers remained secure and productive there is little evidence that they were doing much reading. As a group they probably read an occasional newspaper or pamphlet but conclusive evidence is difficult. Their literary appetites were more turned to the Bible and Almanacs of Ames and Franklin. Poor Richard reached an annual circulation of nearly ten thousand copies and Ames' Almanac about sixty thousand copies. Franklin was known as the "Farmers' Philosopher," the "Rural Sage," the "Yeomens' and Peasants' Oracle" while his Poor Richard was described as "the Bible of the Shop and Barn."¹⁶

Spreading of Reform

By 1830 a multiplicity of forces began seriously to transform agriculture. Among the most important were the cumulative effects of the works of agricultural societies as well as philosophical societies. Industrial development, metropolitan markets, and mechanical innovation for agriculture played no small part in early farm mechanization. Prior to 1830 steel plows were a novelty; after 1830, wooden plows were! A strong rural press made itself more and more felt, and free-men began to feel rising in their breasts some of the high hopes of a people who had time and energy to devote to domestic rather than

¹⁵Percy W. Bidwell, "The Agricultural Revolution in New England," American Historical Review, XXVI (1921), 683-702.

¹⁶For a good discussion of the impact of science within these publications see Chester E. Jorgenson, "The New Science in the Almanacs of Ames and Franklin," The New England Quarterly (1935), 555-61.

revolutionary matters, to peaceful rather than warlike scenes. These were the same feelings voiced by a few creative and original thinkers a half century earlier, but now the words were on the lips of every ploughman. That they should exercise an inordinate interest in education should come as no surprise.

A time will come when the name Swiss will
be forgotten. But in a thousand years man
will yet know what Fellenberg was.

Letter, Malten to Fellenberg
March 26, 1834

CHAPTER V

THE EDUCATIONAL WORK OF PHILIPP EMANUEL VON FELLENBERG

Philipp Emanuel von Fellenberg (1771-1844) was born the son of an eminent Swiss official. Although often ill as a child, his father's wealth allowed him a personal tutor whereby he came abreast of much of the enlightenment. His life and work were directly stimulated by Rousseau, Kant, Herder, Fichte, and perhaps most of all by Pestalozzi.

Freely, Fellenberg appears to have been a humanitarian possessed of a warm love for man and a wonderful character which carried him to heights of creative force, of fanatical industry and urgency for accomplishment that we today find easier to admire than to understand. After a childhood not unlike Rousseau's Emile, and after himself studying Pestalozzi's works, plus a close association with the agricultural interests of his father, Fellenberg embarked upon a short-lived political career.

The French Revolution was close enough to Switzerland and to the intellectual ferment of the times to precipitate Fellenberg's political vagueness and sentimentality into a clear conception of an educational undertaking, one which he saw as a germ cell ultimately to stretch far beyond national boundaries to strike at the social illness and moral decay of the day. He and Pestalozzi viewed the latter as resulting from the spreading religious and ethical instability of their times. Himself a believer in Providence, conscious of a godly mission he was

to fulfill, he worked with a unique physical and psychic strength. Fellenberg recognized his power to break all resistance through uncompromising and self-confident exertions and felt justified in his aggressive approach because of the growing sentiment he shared with Pestalozzi that the world stood in a dangerous point of change.

Accomplishment of his educational goals hinged, he felt, upon his winning the influence of higher social classes over the world. Consequently there arose at Hofwyl a system of education consisting of a poor school, a realschule (a modern scientific school), and finally a "scientific" education for the higher classes. Changes in any of these areas were immediately communicated to educated people as well as to the peasantry. It was Fellenberg's conviction that a genuine professional education must be built from an ethically founded scientific education.

Orchestrating as it did both a humanistic ethic and the aristocratic element, we are not to be surprised that Hofwyl spawned some of the most prominent socialists of the following generation. Also the geographical environment and enduring contact with agriculture formed integrating elements which united all the students. Although Fellenberg could not alone build a professional character for agriculture, he wanted very much to arouse an understanding for the necessity of agriculture and its improvement. His feeling was that culture would always begin with "agri". As a farmer, Fellenberg himself was a persuasive adherent to the rational approach of Albrecht

Thaer.¹ He was a genius at organizing and executing the functions of an educational community, and as an economist he stands out as an efficient and imaginative entrepreneur. It was Fellenberg's administrative ability which marks him so clearly from the less successful Pestalozzi, and, incidentally, which probably accounts for both his decision to carry his own school as well as for its subsequent financial success.²

In spite of rationalist inclinations and a moderately realistic view drawn from the day, in the foundation of his thought Fellenberg was an idealist whose final goals were grandiose. Contemporaries found reason to admire or to despise him, but they recognized him by his over-evaluation of new methods of agricultural cultivation which, in his opinion, would produce a thorough-going political, moral, and religious metamorphosis.³

¹For a brief review of Thaer's work see Sigmund von Frauendorfer, Ideengeschichte Der Agrarwirtschaft und Agarpolitik, (Munchen: Bayerischer Landwirtschaftsverlag, 1957), Vol. I, p. 206-07.

²After a short-lived partnership, Fellenberg and Pestalozzi parted company primarily because of demands by Fellenberg that the organization be operated in a formal and businesslike manner. Pestalozzi insisted upon warm personal relations--even though the finances and discipline of the school might suffer. See Kate Silber, Pestalozzi: The Man and His Work, (London: Routledge and Kegan Paul, 1960), p. 161-62.

³For treatment of Fellenberg's position and influence in Europe see Hugh M. Pollard, Pioneers of Popular Education: 1760-1850, (Cambridge: Harvard University Press, 1957), p. 42-63. A fine biographical study was published by Kurt Guggisberg, Philipp Emanuel von Fellenberg un Sein Erziehungsstaat, (Bern, Switzerland: Herbert Lang and Cie, 1956), two volumes. See also a brief autobiographical sketch by Fellenberg written for the American Journal of Education, I (1830), 341-47.

The School

Fellenberg's utopian ideal was to unite all levels and stations of people and all stages of life from childhood to senility into a single educational organization. Although he was a charismatic individual in many ways, he was not nearly prepared to accomplish his lofty ideals. The Napoleonic times rang with the din of war and the horror and misery which accompany it. Yet in spite of his unrealism his aspirations provided a stimulus and directiveness to immediate and subsequent efforts, both for Fellenberg himself and for his subordinates, which channeled energies into productive avenues and stimulated a vast range of enthusiasms.

The scientific institute for the sons of the higher classes grew from the necessity of educating Fellenberg's own children. As Pestalozzi's life work was influenced by pedagogic questions to his son, so was Fellenberg's undertaking an outgrowth of his need to educate his family. The foundation of the higher school resulted in 1808. In the early years the philosophy and instructional method was influenced heavily by Herbart. This Fellenberg re-directed toward Pestalozzi's methods about 1819. At first the school had only 12 to 15 pupils but by 1817 the period of distinguished service began so that by 1819 the school had 100 pupils and was engaging 33 teachers mostly from France, Germany, and Italy.

Aside from an early introduction to natural science, the curriculum was aristocratic, with languages, history, and classical studies taking the largest portion. Other subjects of the higher school included natural and mental philosophy, chemistry, music,

drawing, gymnastics--including riding, swimming, throwing the lance, and dancing. Natural history "in all its branches," religious instruction, and gardening were also included.

A plan of student self-government added still more color and attractiveness to the entire enterprise. Robert Dale Owen, who attended the classical school for three years, remarked: "Hofwyl was not only a seminary for education. It was also an independent, self-regulating, self governing community."⁴ The internal government of the school was regulated by a constitution and by-laws administered by the pupils, as well as executive officers and a legislature, all under the supervision of the principal.

The Poor School

The first attempt to establish the poor school was made in 1801, but the "school of agricultural industry" was not opened until 1810. At first Fellenberg wanted to take only the spotless children of upright poor families. Part of the problem encountered here was that he found few such families and another part that those he did find were reluctant to give up their children. He at last took destitute children and young delinquents.

Johann Jakob Wehrli elevated the poor school to a position of world-wide fame. He began his educational work with four boys and by 1811 this group had grown to thirty. By 1830 the number under his guidance was one hundred and thirty. About sixty of these trained to become teachers of farm children. In his report to America on the

⁴J. Park and B. Park, "Robert Dale Owen's Lecture on Fellenberg's School," School and Society, LVI (1942), 466-69. See also The Free Inquirer, (June 3, 1829).

school, John Griscom reveals some of the secrets of the success of the poor school:

Their teacher (Vherly) is a young man of very extraordinary qualifications. He received his early education from his father, who filled, in a distinguished manner, the office of schoolmaster for thirty years. He began at an early age to assist his parent in the discharge of his office. On coming to reside with Fellenberg, his views were further expanded, and he entered with enthusiasm into the concerns of the establishment, and willingly undertook the formation and direction of the class of the poor, in all their exercises, agricultural, literary, scientific, and moral. He lives with them, eats, sleeps, and works with them, dresses as they do, and makes himself their friend and companion, as well as their instructor. He is eminently fitted for such an occupation by his genius, his address, his temper and disposition, and above all by his religious principles.⁵

With his usual far-reaching goals, Fellenberg gave the "Wherli-schule" five tasks: (1) Training and hardening of physical powers (2) spiritual education (3) intellectual development (4) ethical (moral) education and (5) professional (vocational) education.⁶ As a rule, the student remained until he was twenty-one years of age. Wehrli put on the attire of a pauper, lived, ate, and worked day and night with his boys. His extraordinary ability and aptitude for handling young men clearly accounts for the success and fame of this division of Fellenberg's undertaking.⁷

⁵Edgar Knight, ed., Reports on European Education by John Griscom, Victor Cousin, Alvin E. Stowe, (New York: McGraw-Hill, Inc., 1930), p. 42.

⁶Guggisberg, op. cit., II, p. 24.

⁷For the details of Wherli's work see Pollard, op. cit., p. 53-63.

Other Schools

A girl's department was originated and operated for a brief time. Success in this department was not so complete, and upon the death of Fellenberg's wife the girl's division was closed. A similar fate did not befall the "Realschule," or middle class school which Fellenberg decided to found in 1822. At first Wehrli was put in charge but two years later Fellenberg's son Wilhelm took over its management. The Realschule finally opened formally in 1830.

The "Maikolonie," a school of agricultural industry, was opened about two hours ride from Hofwyl on May 15, 1826 with 30 pupils. It was, in fact, a Wehrli school whose supervisor, Pfeiffer, was a veteran of Wehrli's instruction and a disciple of his method and technique.

Other facilities at Hofwyl included shops for instrument construction--particularly for design and production of agricultural machinery--shops and tools for clothing manufacture, a printing and lithographing establishment, and a six-hundred acre farm which all helped to round out this ultimate community.

The Collapse of Hofwyl

The system of educational arrangements which had been aligned by Fellenberg drew its inspiration from his strong character, his administrative veracity, and his dream of a better world. As Fellenberg died in 1844 the system began almost immediately to crumble, and what had taken a lifetime to create came down of its own accord in a brief four years. Upon his death a newspaper characterized him with the following words: "Fellenberg was an aristocrat in his private life, a democrat

in his deeds, liberal with friends, a despot to those who would use him as a tool, radical in his objectives, conservative in resources, a rich material, a great man....⁸

Fellenberg's Impact on America

Of the more than a hundred reports published in Europe and America concerning Fellenberg's progress, the first and most important was that of John Griscom (1774-1852). Griscom had a position of authority and respect as an educator in the field of chemistry, giving lectures on this subject to his classes as early as 1806. Upon return to the States in 1819, Griscom published his accounts of Hofwyl in The Academician.⁹ More widely read and reflected upon were the two volumes he published in 1823 entitled A Year in Europe. Here Griscom gives a full accounting of his visits with Fellenberg, describing the personal, philosophical, and pedagogic traits of the great man. The higher school, the poor school, the workshops, the "gymnastic fixtures," agricultural activities, the student government and even personal traits of some of the teachers are mentioned. An already sympathetic review of the school's activities was made even more impressive when he closed his discussion by saying:

I cannot but cherish the hope, that this scheme of education, of combining agricultural and mechanical, with literary and scientific instruction, will be

⁸Quoted by Guggisberg, op. cit., II, p. 510.

⁹The Academician, (New York), (1819), I, 327. See also the issues immediately following, passim. For a sketch of Griscom see American Journal of Education, VIII (1860), 325-47.

speedily and extensively adopted in the United States. I am aware that it would have to contend with serious difficulties.

.....
 The pulse of the nation has already been felt on this subject by a benevolent individual, (our friend M*****), who having visited the institutions of Pestalozzi and Fellenberg, was resolved, if possible, to establish one or more schools in the United States, on a similar plan. But after traveling from New York to Lake Erie, he could find no one who would agree to second his views; none who did not consider the plan, as either unnecessary or impracticable. Thus discouraged he relinquished the project, though few persons in the world would have supported it by greater pecuniary sacrifices.

These reports were recognized by Edgar W. Knight and reprinted in 1930 as a part of his Reports on European Education.

As in most matters of human communication, mutual understanding between Fellenberg and Griscom was less than perfect. Griscom reports that Fellenberg

... considers society as divisible into three distinct parts: the higher, (comprehending the noble and wealthy), the middling, and the poor. The greatest defects of education, he supposed to exist in the two extreme classes. That, these distinctions or classes among men, would always prevail, in every civilized country, he believed to be incontrovertible; and, of course, any attempt to break down the distinction, would be fruitless.

While Fellenberg was by no means an aristocrat in the traditional sense of the word, it is no surprise that Americans looked upon this statement as a tribute to the old European order. That was a costly and unfortunate misunderstanding. His schools could never be adopted by a country determined to raise every man to the level of a Newton. Just what changes were to be made became a worrisome problem.

Josiah Holbrook

In 1819 Josiah Holbrook attempted the "Fellenberg Plan" at Derby, Connecticut. This failure led to another attempt in 1824. After the second unsuccessful trial, he began agitating for adult education generally, and he is now known as the "Father" of the "Lyceum Movement" in America.¹⁰

Neither the trial in 1819 nor the one in 1824 is as thoroughly documented as we might wish. Carl Bode, who has done the most complete study of Holbrook's works, reports no biographical material and no reliable account of his early life. Rev. Cyril Pearl of Maine wrote a biography about 1860 according to a notation by Barnard in his sketch of Holbrook in the Journal in March, 1860; however, this manuscript has not been located. Barnard mentions that an attempt was made in 1819, then proceeds to describe the 1824 school in more detail. Rev. Truman Coe, a co-founder of the school wrote to a son of Holbrook, in a letter quoted by Barnard, saying of his father:

He had long cherished the idea of endeavoring to found an institution in which the course of instruction should be plain and practical; an agricultural school, where the science of chemistry, and mechanics, and land surveying should be thoroughly drilled into the mind of the pupils by practice. With these views the Agricultural Seminary was commenced in Derby in 1824, and continued to the fall of 1825, under the direction of your father and myself; and, as far as I know, was the first educational movement of the

¹⁰See the American Journal of Education, VIII (1860), p. 229-47; A. C. True, A History of Agricultural Education in the United States, USDA Misc. Pub. No. 36, 1929, p. 31-32, and Carl Bode, The American Lyceum (New York: Oxford University Press, 1956), passim.

kind in all that region. But the institution, being unendowed and on a private footing, labored under many embarrassments, especially in never having land enough to carry out and accomplish the ends of its founders.

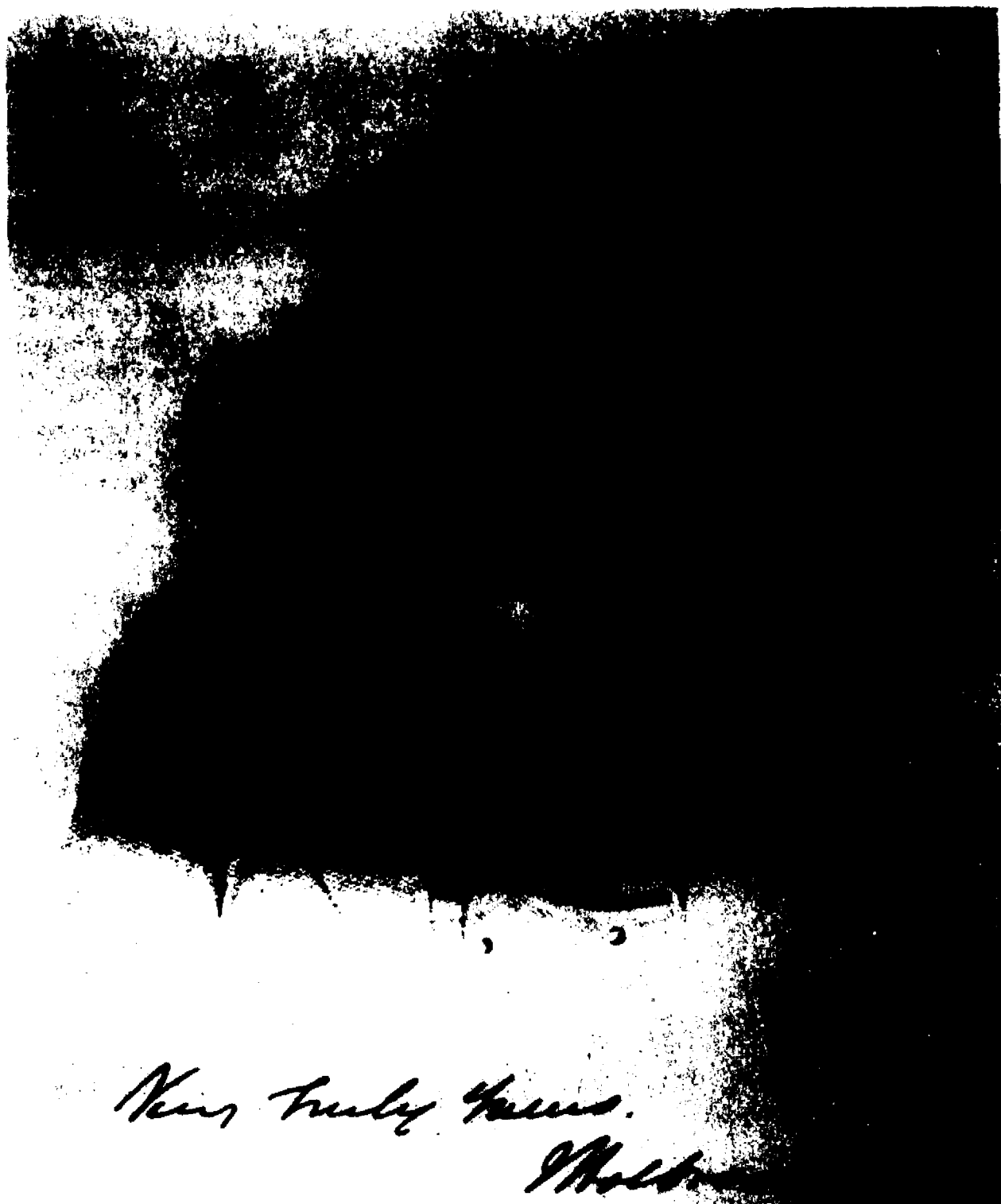
The school had only the equipment and finances which could be arranged by Holbrook himself, and hence suffered a financial strain which must have been most acute in organizing to instruct in chemistry and the other natural sciences. Barnard's description of the school includes a commentary by a former pupil at the Seminary from which the following is quoted:

... those who were so disposed made good progress in useful learning. Several of the boys were intrusted with surveying and leveling instruments, and used them frequently and successfully. Mr. Coe gave special attention to the mathematical studies, and Mr. Holbrook gave lectures and instruction in natural history and allied subjects. The boys rambled extensively over the hills of that region, did some work in hoeing corn and potatoes and in making hay, and once made a pedestrian excursion for minerals, to Lane's mine in Monroe. The working of the school was harmonious,--a spirit of study generally prevailed among the pupils, and the supply of out-door exercise was ample.¹¹

An interesting point concerning the school is that it placed emphasis on "qualifying teachers" as well as practical agriculture, thus making closer its relationship to the other schools arising about this time. The school operated for somewhat more than a year during which time it accepted about fifty students, both boys and girls.

"

¹¹Henry Barnard, "The Agricultural Seminary at Derby," American Journal of Education, VIII (1860), 248.



4. Josiah Holbrook, (1788-1854) the first man in America to attempt the Fellenberg plan of education, and "Father" of the American Lyceum. (Frontispiece to Volume VIII of Barnard's American Journal of Education, 1860).

Others

In 1806 Fellenberg wrote to Benjamin Vaughan in Maine concerning moving to the New World.¹² The friendship between the two men was important because Vaughan, in turn, was involved in the founding of the school credited with being the first agricultural and mechanical institution in the United States. This was Gardiner Lyceum, founded in 1823. The extent of the idea exchange between the two men is known to have been great. Vaughan's relationship to Gardiner Lyceum is discussed in chapter seven.

In 1816 Anthony Morris visited the Fellenberg institution with a view to introducing its practices and principles in the United States, but the school, Bolton Farm, did not materialize until May of 1831 and then persisted a short while.¹³

Rensselaer School was founded in January of 1825 at Troy in New York by Amos Eaton and Stephen Van Rensselaer. Eaton, the principal agent in establishing the school, visualized the role of Rensselaer as being that of a teacher-training institute. "Operative Chemists" were trained to give lectures to rural groups. The relationship of this school to the Fellenberg effort is vague. Although repeatedly aligned with the manual labor movement¹⁴ and thus

¹²Guggisberg, op. cit., II, p. 502.

¹³American Farmer, IX, (1827), 34, 125.
American Farmer, IX, (1828), 378-79.
American Annals of Education, I, Jan. (1831), 37.

¹⁴See Richard Boone, Education in the United States (New York: D. Appleton and Co., 1903), p. 223; also see Elwood P. Cubberly, The History of Education (New York: Houghton Mifflin, 1920), p. 798; also see H. G. Good, History of Western Education, Second Edition (New York: D. Appleton and Co., 1903), p. 407.

automatically a part of the avalanche started by Fellenberg and Pestalozzi, this association has probably been overemphasized. Eaton copied none of the Hofwyl arrangements; he taught "operative chemistry", and had no school of agricultural industry or classical school for the upper classes. Himself provoked by the association, Eaton severely denounced the Swiss school in 1828 saying Fellenberg himself had abandoned it.¹⁵ The story of the founding of Rensselaer is well presented in McAllister's excellent biographical study of Amos Eaton.¹⁶ It is interesting also to note that the guest book at Hofwyl was twice signed by a member of the Rensselaer family from America--once in 1819 and again in 1828.¹⁷

At least two historians take notice of private agricultural establishments of an educational character in the state of Maine early in the 1820's. One is mentioned as being located near Portland in 1821,¹⁸ and another was established at Readfield in Maine in 1822. Robert Hallowell Gardiner went there in 1822 and received the final

¹⁵American Farmer, X (1828), 17-18, Livingston Register, (April 29, 1828); New York Farmer and Horticultural Repository, I (1828), 65-66.

¹⁶Ethyl M. McAllister, Amos Eaton, Scientist and Educator (Philadelphia: University of Pennsylvania Press, 1941).

¹⁷Guggisberg, op. cit., II, p. 427-28.

¹⁸Good, H. G., op. cit., Second Edition, p. 407.
Cubberly, Elwood, P., op. cit., p. 801.

stimulus prior to establishing his Gardiner Lyceum in 1823. In fact, the reports that literary study and manual labor in agriculture and the mechanical arts could be satisfactorily combined were so well received that one finds it meaningless to attempt to trace the influence further, for it is to be found in varying forms and degrees in most of the educational organizations begun during the second, third, and fourth decades of the nineteenth century.

Seventy-five or more schools were founded in America during the second and third decades of the nineteenth century as a result of conscious pursuit of at least some part of the ideas first brought to fruit by Fellenberg and Pestalozzi in Switzerland. Among the most widely influential of these we must list the Fellenberg Institute at Windsor, Connecticut, Oneida Institute at Whitesborough, New York, the school at New Harmony in Indiana, the Hofwyl School at Maysville, Tennessee, and the various schools operated by Joseph Neef whose work was, however, of a slightly different character than Fellenberg's and mostly at an earlier period. In all educational endeavors of this sort the northeastern tier of states led the southern states by one to five years. The sole exception to this is a poor school endowed by a French Huguenot, Dr. John de la Howe, of South Carolina in 1796.

Fellenberg's Personal Relations With America

As a boy Fellenberg had received strong impressions of the American war of Independence. He took special notice of Franklin, Washington, and Jefferson, holding them up as humanitarian heroes. In 1806 he seriously considered a move to the United States but

misunderstandings with Benjamin Vaughan, accompanied by a considerable loss in capital invested in America, cut short any hopes he had of living in the New World. Fellenberg read carefully the newspaper reports and corresponded with Oliver W. B. Peabody, secretary of the Boston Society for Diffusion of Information Among Emigrants. Although badly treated here a great many Hofwyl students managed the trip to the states in short time. One of Fellenberg's students, F. A. Ismar, helped to organize Bolton Farm in 1830, and a whole troop of Fellenberg's pupils were encountered in New York by Joseph Kammerer in 1839.¹⁹

Because of his convictions about the world's need for his educational arrangements, Fellenberg enthusiastically welcomed William Channing Woodbridge (1794-1845) as a guest and teacher in Hofwyl. This proved to be a profitable engagement, as Woodbridge published a dozen or so reports about the Swiss school. Woodbridge, invited in 1818 to become professor of chemistry at William and Mary College, chose instead to teach at an institute for deaf and dumb until his health failed in 1820, whereupon he went to Europe for a year. His health failed again in 1825 and in 1827. He returned at last to New York in the autumn of 1829 after several extended visits in Hofwyl, remarking that he felt "enriched beyond measure" by Lord Brougham, Lady Byron, Dr. Chalmers, Dr. Andrew Thompson, M. de Fellenberg, Barron Humboldt, and Pestalozzi.²⁰ In August of 1831 Woodbridge purchased the American

¹⁹Guggisberg, op. cit., II, 502.

²⁰The American Journal of Education, V (1858), 55-57.

Journal of Education through which his experiences at Hofwyl were spread over America during the remaining years of his life.

Not all the visitors to Hofwyl hit an immediately effective relationship with Fellenberg. At least one American teacher, S. C. Dole, clashed sharply with him. Dole perceived Fellenberg's personally-colored belief in Providence to be supported by a massive supernaturalism, whereupon he tersely replied that from day to day God did few miracles. This presented Dole's Deism to Fellenberg as a blasphemous view, and in the moments which followed, an unpleasant exchange of words ended in blows between both men. In subsequent criticism Dole attributed nothing to Fellenberg and spoke of him as a miracle-believing dreamer.²¹

When Joseph Cogswale visited both Pestalozzi's school and Fellenberg's in 1817 he apparently carried away a more favorable notice of Fellenberg which was incorporated in his own "Round-Hill-School".

The Manual Labor Idea

Working with a rather vague knowledge of Fellenberg's practical achievements, America attempted to translate the many aspects of the enlightenment into classrooms. In this connection there arose a "manual labor" movement, and in 1831 the "Society for Promoting Manual Labor in Literary Institutions" was founded by Lewis and Arthur Tappan. Theodore Weld, a pupil experienced in the manual labor curriculum at

²¹Guggisberg, op. cit., II, p. 505.

the Oneida Institute, was appointed General Agent. Weld demonstrated that no better choice could have been made by beginning a lecture tour of the New World with feverish and evangelistic vigor lecturing to all who would listen to the virtues of combining literary and manual exercises. Weld called Fellenberg "the apostle of modern education."²²

Long Range Effects

The influence of the Fellenberg establishment did not cease when Fellenberg died nor did it cease when Hofwyl collapsed a few years later. Indeed, it would seem almost that the greatest impetus came afterward. Fellenberg's frank class outlook²³ disturbed Americans and most observers saw that the Hofwyl arrangements would have to be modified before being acceptable to our peculiar circumstances. This sentiment was precisely what motivated the Genesee Farmer to chide the Empire State in 1837 for failing to do what Fellenberg was presumed to be doing in Switzerland.²⁴ We could have easily transplanted the basic school but that would not do. What we were to do was to bring the new learning and the new philosophy to education in America.

Still another indication of the longer range influence of Fellenberg's accomplishments is indicated in that Henry Barnard's

²²Theodore D. Weld, First Annual Report of the Society for Promoting Manual Labor in Literary Institutions, (New York: S. W. Benedict and Company, 1833), p. 15.

²³Edgar W. Knight, Reports on European Education by John Griscom, Victor Cousin, Calvin E. Stowe, (New York: McGraw Hill, 1930), p. 39.

²⁴Genesee Farmer VII (1837), 158-59.

incomparable American Journal of Education, the most influential such publication in America, published articles about the Hofwyl experiment in 1857, 1861, 1863, and 1876.²⁵

The broad influence of Fellenberg's activities may be split into two aspects: (1) the dignity and social regeneration potential inherent in combining literary and manual pursuits, and (2) the importance and practicality of providing for study of agriculture. While Fellenberg's student government, physical training, and ethical education must not be over-looked as definite influences, the former two areas were probably of most importance particularly for the subject of applied science.

The first of these two contributed heavily to the manual labor movement that swept the country about 1828 to 1833. The second gave an original and strong impetus to the study of the science of agriculture in formal school situations as well as providing a model for mechanical (industrial) training at lower levels. It seems that every educator in America who agitated for agricultural studies had drawn his inspiration from Switzerland. Fellenberg's school of agricultural industry captivated the imagination of the New World gentlemen farmers. More than a few attempts were made to copy it--not alone for the sons of the poor but for the middle class farmer's sons as well. For this reason editor John S. Skinner of the American Farmer kept a watchful eye on every report from Hofwyl, faithfully reprinting such as appeared, as well as keeping a finger on the pulse of agricultural

²⁵American Journal of Education, III (1857), 591-96; X (1861), 81-92; XIII (1863), 323-31; XXVI (1876), 359-68.

education as it developed across the new world. Gardiner Lyceum and Rensselaer School did not go unnoticed nor did earlier attempts made by Elkannah Watson. The founding of Bolton Farm in 1830 in Pennsylvania was not only celebrated in the American Farmer and the New England Farmer but also received written commendation from the Philadelphia Society for the Promotion of Agriculture.²⁶

Aside from the Lancasterian methods, Fellenberg and Pestalozzi were the primary European influences on American education. From 1820 to 1830 the talk of educational reform was significantly colored by what the Swiss couple were doing at Hofwyl. Rationalistic education, student self government, ethical training, physical education, many elements of the scientific parts of education (especially the utilitarian), agricultural education, mechanical training and manual labor training all owe significant debts to Fellenberg, to Pestalozzi or to both.

Americans at Hofwyl

Between the years 1811 and 1830 sixty-five Americans signed the guest book at Hofwyl. By 1847 when the book was closed one-hundred and twenty-eight American signatures had been entered. Among these we find the names of John Griscom, J. and P. Van Rensselaer, Philipp Horn, William Ellery Channing, William MacClure, W. C. Woodbridge, John E. Howard and others of similar political and social prominence. With the inclusion of Hofwyl in Goethe's "Wilhelm Meister's Wander Jahre,"

²⁶In the American Farmer see volumes I-XIV; in the New England Farmer see volumes I-XII.

a veritable deluge of important visitors rained in daily at the little Swiss town. In all, the guest book contains three hundred and twenty-four pages and about twelve thousand signatures.²⁷

Fellenberg's Influence in Other Countries

Twelve thousand registered guests means that someone visited almost every day for the thirty-six years during which a book was maintained. But the greatest number of visitors came between 1825 and 1835, arriving quite literally in troops and wanting to see every part of the famous institution. Throughout the summer twelve to fifteen visitors arrived daily, but on at least one occasion a crowd of fifty guests assembled at Hofwyl.²⁸ The unknown, the famous, the rich and the poor--all were welcomed and given a tour of the facilities. Statesmen, farmers, princes, queens, manufacturers, theologians, teachers, lawyers, doctors--all came to see the program in operation. From Japan, Mexico, France, England, Russia, Germany, Australia, Italy, Poland, Greece, the Netherlands, Denmark, Spain, Portugal, and South America generally, they came seemingly without ending. Just what impressions they carried away from the school is difficult to ascertain. In his history of Fellenberg's work Guggisberg has attempted an evaluation on many fronts and has settled the limits reasonably well.

²⁷Guggisberg, op. cit., II, p. 36. The entire guest book is appended to volume II, p. 523-34.

²⁸Guggisberg, op. cit., II, p. 36.

Summary

It seems Fellenberg took the hopes and fears of the enlightened people of the early years of the nineteenth century and fashioned an educational organization that caught their eyes as well as their hearts. He was not himself a profound or creative thinker but a doer. And it was not Fellenberg's work that people copied as much as it was the ideas and aspirations he incorporated into Hofwyl. In fact, Fellenberg is best viewed as the catalytic agent that triggered a worldwide reaction between education and the knowledge of the enlightenment. In his attempt to gain the respect of the upper classes one would judge he more than accomplished his goal. This "unyielding class outlook," as Americans saw it, became the one phase of his undertaking which was seriously objectionable by Americans.

Although utopian, Fellenberg's work seemingly justified others to incorporate new methods and techniques in education which might otherwise have been frowned upon as impractical, unacademic, or simply unimportant. His was a form of escapism from contemporary European society, with over-tones of social regeneration tied primarily to the dignity of labor and the impending agricultural revolution.

"The system of education which is generally pursued in the United States, is unphilosophical in its elementary principles; ill adapted to the condition of man; practically mocks his necessities, and is intrinsically absurd. The high excellence of the system in other respects are readily admitted and fully appreciated. Modern education has indeed achieved wonders. But what has been done meanwhile for the body? (Nothing--comparatively nothing.) The prevailing neglect of the body in the present system of education, is a defect for which no excellence can atone. Nor is this a recent discovery. Two centuries ago Milton wrote a pamphlet upon the subject, in which he eloquently urged the connection of physical with mental education in literary institutions. Locke inveighs against it in no measured terms. Since that time, Jahn, Ackerman, Salzman, and Franck, in Germany; Tissot, Rousseau, and Londe, in France; and Fellenberg in Switzerland have all written largely upon the subject.

- Rev. E. F. Stanton
An address delivered at
the annual commencement
of Hampden Sydney College,
Virginia, Sept. 1835, and
published in the Southern
Literary Messenger, II
(March, 1836), 224-252.

CHAPTER VI

THE MANUAL LABOR MOVEMENT IN AMERICAN EDUCATION

As the 1820's began and Americans were hearing more and more about the educational work of Pestalozzi, Fellenberg, and Wherli, two factors involved in the moral structure of the American mind were to play an important role in determining the course of educational activities during the next two decades. A strong sentiment existed that an educational organization was needed which would bring a literary training within the easy reach of every man, woman and child. This idealistic view was both a part of the philosophical climate of the age of the enlightenment and a reaction against the aristocratic educational facilities of Europe. It was largely felt that the success of the free world hinged around the enlightenment of its populace. In the words of Washington's farewell address: "...in proportion as the structure of a Government gives force to public opinion, it is essential that public opinion should be enlightened."

The second important facet of American thought was the dignity inherent in hard physical work. So much work was to be done on the raw countryside that any other view would have been unthinkable. Related to this view is the fact that Ben Franklin's aphorisms had found their way into the vernacular of the country. Thus a rather good picture of the educational climate of the new world emerges. Fellenberg's far-reaching attempts at the creation of a new social order

through ethical training and agricultural reform found an eager and intelligent but notably small audience in America. On the other hand, the idea that labor could perhaps be connected with literary work, to the advantage of both, found a whole nation ready to engage in the program, especially since the suggestion had been made that students might thereby earn enough to pay part or all of the expense of their education.

So it was that "manual labor schools," as they were known, came into pedagogic vogue. The person who established such an institution was second in moral uprightness only to the one who organized a church. We may safely add that America badly needed schools at all levels and since the means to organize and operate the program was badly lacking, all the more impetus was added for the adoption of manual labor, both mechanical and agricultural, to the literary enterprise.

The popular historical mistake has been to treat the movement from its beginning to its final consequences more or less exclusively in this light. Yet for the developments which were to take place in the next forty years the few individuals who caught up some other aspect of the program were of far more importance--such as was done by Gardiner, Eaton and Maclure. Ezekiel Holmes, a teacher at Gardiner Lyceum, and editor of the Maine Farmer asserted in 1833, "...many even now, admit that it is possible for a man to have a tolerable share of information and yet be a farmer." Holmes continued,

That studies and labor may be pursued at the same time to great advantage, is now admitted, and manual labor schools are becoming all the rage. To enjoy all

the advantages of labor and study mixed, what class of people are so favorably situated as the farmer? And what school would be so beneficial to society as one having agriculture for its main object?Let every young farmer qualify himself for a legislator, and when so qualified, let his calling be represented according to consequence.¹

These interesting phrases are indicative of the burning idealism which accompanied the entire movement.

The Manual Labor Society

The most significant development of the period was the establishment in 1828 of the Society for Promoting Manual Labor in Literary Institutions. Apparently Lewis and Authur Tappan played the important role of financing this organization.² One might easily under-estimate its significance: the society lasted only a year or so, sponsored only one agent, published a single annual report. However, to judge on this basis alone would be a serious mistake. The list of officers of the Society reads not like "Who's Who in American Education" but more like "Who's Who in America." Among the officers one finds a U. S. vice presidential candidate, university presidents, lawyers, a judge, a senator and a publisher--to name but a few. And to think the single general agent, Theodore Weld, a boy still in his twenties, could scarcely have had much effect on education is equally dangerous. In fact, Weld's biographer, Benjamin Thomas, says "Indeed, for a few

¹Maine Farmer, I, (1833), p. 20.

²Benjamin P. Thomas, Theodore Weld (New Jersey: Rutgers University Press, 1950), p. 25.

years it seemed that Weld's efforts...might give a new direction to education."³

Theodore D. Weld (1803-1895) was no casually chosen agent. The Tappan brothers had offered him a Presbyterian pastorate apparently because they were greatly impressed with his oratorical record. When Weld declined, they engaged him to deliver the message of manual labor. Since Weld was an enthusiast and graduate of manual labor education (Oneida Institute), he fell into the job with a missionary zeal, an oratorical greatness, and a physical prowess probably not to be found elsewhere. After the end of his year in the field, Weld reported,

...I have traveled...four thousand five hundred and seventy-five miles; in public conveyances, 2,630; on horseback, 1800; on foot 145. I have made two hundred and thirty-six public addresses.... I have written two hundred and eighty-two letters upon the business of the Society, and received more than that number....⁴

After an unfortunate accident fording Alum Creek, Weld crossed Ohio, Indiana, Illinois and Missouri, then headed South to Tennessee, Kentucky and Alabama. Weld's personal exposure to the system and its inner workings, his mental quickness, his rather good background of literary knowledge, his brilliant oratory, and his own physical powers were such that he presented the best possible image and hence was received well everywhere. Weld spoke forcefully on physical health, on agricultural science, and on literary studies, thereby demonstrating a range of intellect uncommon for a man of his age. It is not possible

³Ibid., p. 39.

⁴Theodore Weld, First Annual Report of the Society for Promoting Manual Labor in Literary Institutions (New York: S. W. Benedict & Co., 1833), p. 10

to sample the scope of Weld's arguments here; however, some particular comments concerning agricultural and mechanical education seem called for. While he asserted that the only difference in the old and the new forms of education was in the use made of leisure time, he went on to say the system

... would enable the sons of our farmers and mechanics to acquire a thorough knowledge of those branches of science whose practical application to agriculture and the mechanic arts would greatly increase both in quantity and quality the productions of the soil, and enhance the value of mechanical products. The benefits resulting to the farming interests especially, from a thorough acquaintance with the sciences of chemistry and geology are little appreciated in comparison with their practical importance.⁵

In the same work (1831-2) Weld erroneously wrote,

There are as yet no schools in this country, where agriculture and mechanical arts are taught, yet they are manifestly a desideratum. At such schools, those who are expecting to engage in those employments for life, might spend one half the day in intellectual pursuits, and the other half in prosecuting agriculture, horticulture, and the mechanic arts, on scientific principles, under the direction of competent instructors. ...In the selection of a location for an institution upon this plan, the farm should contain, if possible, a variety of soils, from the lightest to the richest alluvial, in order that the students may have before them a practical exhibition of the different modes of cultivation adapted to different soils; the kind and degree of tillage required of each; the preparation of composts for furnishing the requisite manure. The said farm should also possess water privileges for mechanic shops.⁶

⁵Ibid., p. 63.

⁶Ibid., p. 94.

FIRST

ANNUAL REPORT

OF THE SOCIETY FOR PROMOTING

MANUAL LABOR

IN LITERARY INSTITUTIONS,

INCLUDING

THE REPORT OF THEIR GENERAL AGENT,

THEODORE D. WELD.

JANUARY 28, 1833.

NEW-YORK—S. W. BENEDICT & CO. 162 NASSAU STREET.

SIDCCCKXRIII.

[D.C.—Postage—8 ctavia periodical, not over 100 miles 15 cents; any greater distance 25 cents.]

5. Title page to Theodore Weld's report to the Society for Promoting Manual Labor in Literary Institutions. The report was widely circulated and received much praise.

Theodore Weld, then, was very much in favor of utilitarian education. His commission from the Society, however, was not at all within this realm; and Weld could go only so far. He consents

It should be remembered, that it is not the aim of the manual labor system to make students finished mechanics and scientific agriculturalists. Three hours labor are required of the student, because he needs that amount for exercise....

Even in his later years Weld never lost sight of the value he attributed to physical exercise, but this particular quotation probably is best interpreted as an apology; his previous emphasis on the value of such work as agricultural chemistry could scarcely be related to much physical exertion.

Secular and Religious Aspects

The moral fiber of the manual labor plan held considerable appeal for the various religious sects in schooling their promising students for the clergy. The Baptists, Presbyterians, and Methodists were most active in establishing schools or adapting existing facilities to the manual labor idea. Clearly no small part of the movement is to be attributed to the vigorous work in religious circles. A strong moral basis was to be gained from the dignity of work, from the "disciplining of the will" and from not being the recipient of charity while attending school.

In state and private schools the idea was no less appealing. To the West, land, lumber, and other raw materials were plentiful but labor was scarce. There were forests to clear, land to break-out and crops to harvest. Homes, schools, churches, and business establishments

were to be constructed and maintained. If the students could help perform these tasks while being educated, then very good. If labor would even improve the quality of their education, then so much the better. Private schools arose here and there, legislatures contemplated the idea as a method of teacher training, and in 1836 a resolution was introduced in the United States Senate directing the Committee on Public Lands to inquire into the possibility of making a grant of land to each of the new states for colleges where the poor could be educated under a manual labor plan.⁷ This was almost three decades before the Land Grant Act was passed, and exactly twenty years before Morrill himself claimed to have formed the idea.⁸ The whole idea of the land-grant colleges was a refinement of the manual labor movement. It removed labor for pecuniary ends, covered over the derogatory concept of a school for the poor, and emphasized the agricultural and mechanical sciences. Certainly the basic concept of universal, popular, and utilitarian education remained little changed and, if anything, was more emphasized.

The Decline

The peculiar defects of the manual labor system were almost immediately visible in the institutions where the trial had been made for a year or more. Records indicate that virtually every attempt

⁷Annals of Education, VI (1836), 134; quoted by L. F. Anderson, "The Manual Labor School Movement," Educational Review, XLVI, (Nov. 1913), p. 379.

⁸W. B. Parker, The Life and Public Service of Justin Smith Morrill (Boston: Houghton Mifflin Co., 1924), p. 262.

later showed the schools to be embarrassed by either the attainments of their pupils or by the balancing of their books. Students were not always fully prepared for their participation in the new plan--with disastrous results. In an address made at Davidson College several years later, Dr. Rumble reflected,

It could be made to appear a most natural thing, by an awkward stroke, to break the handle of a hoe or a mattock, to drive the edge of a club-axe against a convenient stone, or to select an adjacent stump, green and tough, and drive a plow full tilt against its stubborn roots. Then something was sure to break, and it lay within the range of possibility, that the breaker would be sent to the shop to superintend the repair of the fracture. That was so much time gained for rest.⁹

Other reports tell us that rakes and hoes were to be found by the armful under any structure high enough to hide them.

So many small attempts were made at founding schools that none could organize and equip on an operative scale. In his Annual Report Weld lamented "Almost every manual labor school in the country has been shorn of its efficiency by want of funds." And in closing his report he suggested: "It is my deliberate conviction that the injudicious multiplication of manual labor schools will jeopard the system far more than all other causes combined. ...One deep respiration gives more vigor than a thousand gaspings" Weld asserted. "Arm ten full grown men, rather than a myrid of Lilliputians" he surmised.¹⁰

⁹Cornelius R. Shaw, Davidson College (New York: Fleming H. Revell Press) p. 40. (Quoted by Patrick, op. cit., p. 131.)

¹⁰Weld, op. cit., pp. 98-99.

As Weld resigned his post as General Agent he unconsciously reflected the burning moral issues of the movement. In the last lines of his Annual Report he declares:

My heart cleaves to the manual labor system; and, though I can no longer publicly advocate it as the agent of your society, I hope soon to plead its cause in the humbler sphere of personal example, while pursuing my professional studies, in a rising institution at the west, in which manual labor is a DAILY REQUISITION.

This was Lane Seminary at Cincinnati but the point we must not miss is that Weld, having been offered the chair of "Sacred Rhetoric and Oratory" at that same school, chose instead to become a student,¹¹ and ultimately, to become a prime mover in the emancipation of the Negro.¹²

¹¹Thomas, op. cit., p. 42.

¹²Ibid., passim.

Theirs the hands which sowed the seed.
We the reapers. Yet we need
Oft to ponder this anew,
Reapers, we are sowers, too.
Bright or dark be Gardiner's fame,
Ours the glory or the shame.

Let us, the, with common aim
Guard the prestige of her name,
That the struggles, toils, and tears
Of a hundred garnered years
May to future lives express
Glory, grace, and fruitfulness.

--Henry S. Webster in
"The Coming of the Squire"
In Josiah S. Maxcy, The
Centennial of Gardiner,
Lakeside Press, Portland,
Maine, 1903.

CHAPTER VII

THE GARDINER LYCEUM

Same Backgrounds

In 1691 Maine boasted 7 or 8 thousand population; by 1791 this had risen to 100,000 and by 1820 the population was "not quite 300,000."¹ As late as 1816 some 250 to 300 Indians were still inhabiting the state.²

Interest in agriculture and shipping ran about as high in Maine as elsewhere in the colonies. Most of the educated class of the early 1800's had attended Harvard, a citadel of liberal science, politics, and religion. In 1791 an agricultural society was founded at Kennebec (then still officially a part of Massachusetts but now in Maine) and another was established in 1818. At this time there was no school for higher education nearer than Exeter, New Hampshire.³ By 1822 twenty-five academies and the Maine Wesleyan Seminary had been incorporated and twenty-five more were incorporated before 1840.⁴

¹Collections of the Maine Historical Society, VIII, (1881), 158.

²W. D. Williamson, History of the State of Maine, II, (Hallowell: Glazier, Masters, 1832), p. 669.

³Edward W. Hall, History of Higher Education in Maine, U. S. Bureau of Education, Circular No. 3, 1903, p. 197.

⁴Ibid., 199-200 (presents a listing of schools with their dates of incorporation).

In 1803 when Gardiner was incorporated as Maine's 140th town, not over 650 people were to be counted in the township; nevertheless, by 1832 it was said that "...no town in the State can exhibit such a variety of mills, machinery, and other mechanical implements, as Gardiner."⁵

Robert Hallowell built stone dams to operate mills, and founded the first paper mill in 1806. He also built a fulling mill, a furnace, a forge, a nail and spike factory, a pail and tub factory, and a starch mill. By 1812 government officials consented to send mail to Gardiner on a stage coach. Previously, the poor roads had made mail service quite slow: eighteen days were required for the news of Washington's death to reach them in 1799.⁶ The first steam craft on the Kennebec River came in 1818 and a steamboat line to Gardiner was established in 1826.⁷

Robert Hallowell Gardiner (1782-1864)

When the maneuvers of Washington cut off supplies for the British army in March of 1776, Robert Hallowell and his wife Hannah, nee Gardiner, fled to Halifax, Nova Scotia. They later moved to Bristol where their son, the object of this study, was born. The name Gardiner was added in 1803 to comply with the terms of a devise to him from his maternal grandfather, Rev. Sylvester Gardiner, who had received a large amount of land from the Plymouth Company between the years 1754 and 1764.⁸

⁵W. D. Williamson, op. cit., II, p. 597.

⁶Josiah S. Maxcy, The Centennial of Gardiner, (Portland: The Lakeside Press, 1903), pp. 33-34.

⁷Ibid., p. 69

⁸W. D. Williamson, op. cit., II, p. 597.

R. H. Gardiner's first schooling came at Stapleton, a few miles from Bristol, England, where he studied under the Rev. Mr. Cockagne.

In the thoroughly classical curriculum Gardiner later reported:

the missing of a single word (of Latin) was invariably followed by the delinquent being mounted on the back of another boy and the birch applied to his bare flesh, which was preceded by a short lecture, and followed by a bread and cheese dinner.

He continues, however, "the birch was not applied so as to inflict pain, but the disgrace was considered so great that these punishments were not of frequent occurrence."

Upon his return to the states young Robert was placed in a public Latin school under Master Hunt; later to study under Mr. Pemberton, at Phillips Academy, Andover. From here he went to study under his cousin, Rev. Dr. Gardiner, "a very fine classical scholar," and then to Derby Academy at Hingham about 1796. In 1797 at age 15 he entered Harvard College; in 1801 he graduated. Here he was exposed to the finest intellectual ferment of the revolutionary years. Locke on the Understanding, and French philosophy generally were much discussed. In his autobiography Gardiner reflects "The writers of that school, particularly Rousseau, were read and admired, without their fallacy being perceived. Their sentiments were freely discussed in our club...."⁹

His exposure to the racy skepticism of Harvard had left his earlier religious indoctrinations in turmoil. About 1803 he undertook

⁹Robert Hallowell Gardiner, Early Recollections of Robert Hallowell Gardiner, 1782-1864 (Hallowell: Printed for R. H. Gardiner and W. T. Gardiner by White & Horne Co., 1936). Hereafter referred to as Recollections.



6. Robert Hallowell Gardiner, founder of the first institute for career education in agricultural and mechanical science in America, 1823. (after The Centennial of Gardiner, 1903).

a "study of religion" which included Colliers' Literal Scheme of Prophecy, Newton on the Prophecies, Butler's Analogy and Paley's works. He remarks, "My mind was at length relieved from doubt, and I became fully convinced that Jesus Christ came into the world as a propitiation for sin...." This decision was clearly influenced by the intense religious training he received under his sister's inordinately religious care and his father's deep religious nurturing.

Gardiner's religious training had been destroyed at Harvard through exposure to the intellectual currents of the late eighteenth century. He notes that "... French philosophy with its infidelity had become popular. ...Their sentiments were freely discussed in our club, particularly the doctrine of suicide"¹⁰ Gardiner derived his greatest influences from a "coffee club" formed from his classmates in their freshman year. Meeting once a week in a local tavern, the seven members of the club enjoyed "pleasantry and songs," however, serious discussions were the rule rather than the exception and ranged "sometimes on questions beyond our depth, and occasionally on questions that the ablest philosophers have failed to solve." When they graduated from Harvard, Gardiner took second place and two of his club friends took third and fourth. Only one failed to have "a respectable part" on graduation.

After a generally unsatisfactory trip to Europe, Gardiner took possession of the estate which he had inherited from his mother's father. The land was well inhabited by squatters, but Gardiner's tact and generosity smoothed the situation over except for a single case

¹⁰Recollections, p. 42.

which was finally settled in court. In the winter of 1803-04 he toured the Southern States with his college friend John Gorham. Together they reached Savannah where, rather than ride horseback, they purchased a pair of horses and a chair, or settee, large enough to hold two persons and set this on shafts without springs. A colored servant rode one of the horses.

Somewhere along the winter trip Gardiner found time to visit President Jefferson "for half an hour,"¹¹ and later to visit Charleston, South Carolina, where he became acquainted with the Pinckneys, the Rutledges, Judge Dessessauere, Col. Washington (a nephew of the General), and Col. Shubrick. The trip was over in May of 1804.

After marrying Emma Jane Tudor in 1805, the wealthy young Gardiner then participated in fashionable evening parties, dining out "as often as four or five times a week."¹² In addition to having helped establish a periodical, The Monthly Anthology, in 1804, he participated in several literary clubs: the Anthology Club, the Wednesday Evening Club, and the Law Club in Boston.¹³

Among his friends Gardiner counted Dr. Kirkland, president of Harvard, Mr. Webster, Judge Story, William H. Prescott, Lord Jeffrey

¹¹Gardiner took a letter from Benjamin Vaughan to introduce him to Jefferson, who, recognizing from the letter that Gardiner was a Federalist, met him most informally. Gardiner reported that he thought Jefferson was a servant by his attire. Customarily, Jefferson invited guests back the next day for dinner but he disappointed Gardiner by failing to do so. Recollections, pp. 86-91.

¹²Recollections, p. 104.

¹³Ibid., pp. 92, 102, and 145.

of the Edinburgh Review, and, of course, Dr. Benjamin Vaughan who had fled Europe in 1796 to live on land belonging to his wife's family, the Hallowells.

The Founding of the Lyceum

The precise reasons for the founding of the remarkable institution at the town of Gardiner are not known. Neil Stevens gave attention to the history of Gardiner Lyceum and published his findings in 1921.¹⁴ Mostly, Stevens gives credit to R. H. Gardiner himself for the idea of the school, but he also acknowledges an influence from Benjamin Vaughan and Benjamin Hale. Both men had important behind-the-scenes roles.

Benjamin Vaughan (1751-1835) was more than a little involved in the French Revolution. After having served a short prison sentence for his part in the Revolution, a letter by him dissuading against the project of calling in French troops (to bring about a similar revolution in England) was found on a convict, J. H. Stone. Upon hearing this news Vaughan fled to France and later (1796) back to America. Not much is known about Benjamin Vaughan because he himself wished that no biography be written. Among the well known personalities with whom he conducted correspondence were Benjamin Franklin, Joseph Priestley, and Thomas Paine.

In 1779 Vaughan issued the first collective edition of Franklin's works in London under the title Political, Philosophical, and

¹⁴Neil E. Stevens, "America's First Agricultural School," Scientific Monthly, XIII (1921), pp. 531-40.

Miscellaneous Pieces by Benjamin Franklin. He also superintended the Complete Works of Benjamin Franklin (8 volumes) issued in London, in 1806, with a memoir. His own writings appear to have been published anonymously or under a pen name.

Robert Hallowell Gardiner wrote a brief memoir of Vaughan for the Maine Historical Society saying he did not deem it inconsistent with Vaughan's wishes to give a "slight notice" of the gentlemen.¹⁵

Gardiner reports Vaughan was a man of great learning, a rapid reader and a man of broad interests.

His knowledge was always at command, and no subject could be introduced into conversation, upon which he would not give additional information. From the very extensive knowledge and ready power of producing it, he has been called a walking encyclopedia.¹⁶

Both Benjamin and his wife are described by Gardiner as having "speculative notions of education" which were derived from Rousseau and other French writers. The Vaughan children were instructed by private tutors residing in the home. Gardiner describes the tutors as "strange beings selected for some particular acquisition or talent" there being but one exception, a Mr. Merrick. The result of this education seems not to have been remarkable in Gardiner's eyes because it lacked academic rigor. Concerning his personal relationship with Vaughan, Gardiner remarks "We were on intimate terms with the family and exchanged visits once or twice a week." It is thus

¹⁵ Robert H. Gardiner, "Memoir of Benjamin Vaughan," Maine Historical Society Collections, VI, (1859), 85.

¹⁶ Ibid., p. 91.

established that Gardiner not only studied Rousseau's educational methods at Harvard but was a personal friend and constant companion of a leading enthusiast of that school of thought.

Among the many acquaintances Vaughan had made in Europe was one Philipp Emanuel von Fellenberg. The character and extent of their relationship is not entirely known; however the friendship was close enough that Vaughan conducted business investments for Fellenberg in the New World. These, however, were not entirely satisfactory to Fellenberg.¹⁷ On October 15, 1806 Fellenberg wrote to Vaughan about traveling to the U. S.¹⁸ The "memoir" by Gardiner reports that Vaughan had himself came to this country "expecting to find the ideal republic"; he

directed his plate to be sold, and he had his family dressed in the plainest manner. A few years residence here, and observation of the practical workings of our institutions, disabused him of these visionary theories of the purity and unsophisticated simplicity of a democratic republic....

Thus the answer to Fellenberg's inquiry was apt to have been discouraging; that the Swiss philanthropist did not further contemplate the trip probably indicated Vaughan's communication was not exactly visionary.

Vaughan's interest in agriculture is well established. His role as a gentleman farmer in Maine is pointed out by Gardiner:

¹⁷Guggisberg, op. cit., I, pp. 275-77 reports Vaughan to have been a person who "always appears in a questionable twilight."

¹⁸Ibid., II, p. 502.

The agriculture of the country was indebted to Dr. Vaughan for the introduction of new varieties of seed and plants, and for the importation of improved breeds of animals. His fortune was considerably diminished by the large sums expended upon his farm and nursery.

As Vaughan conducted business affairs for Fellenberg and corresponded with him regularly, a knowledge of the educational experiments at Hofwyl could not have escaped him. It is significant that Vaughan and Gardiner were members of the same Hallowell family, lived only a few miles apart, and worked together in a close and warm friendship for the improvement of society.

Benjamin Hale also seems to have played an important role in the Lyceum in the early years of operation. Hale, a tutor in Bowdoin College, was appointed first Principal and Lecturer in Natural Philosophy in January of 1823. Prior to this time his influence seems to have been negligible. Further studies are needed here.

The final stimulus to organizing the Lyceum came from Bishop Alonzo Potter. Gardiner reflects in his autobiography "Bishop Potter was then much engaged in the subject of education, and particularly upon the subject of making it selfsupporting by uniting with it manual labor." The two men rode in a carriage to visit a "Methodist establishment" at Kent's Hill, Readfield, where an exhibit of articles made by students was being sold. It appeared that the income from the objects was more than enough to pay the expenses of the pupils, but Gardiner remarks that upon close inquiry he observed that the

objects were sold to friends who for the encouragement of the institution "were willing to pay higher than the market price for articles not so well made."¹⁹

Unfortunately Gardiner did not specify the date of this influential trip, but writing forty years later he comments, "I afterwards tried the experiment, fitting up a shop with water power, and charging no rent to the person who had charge of the lands, but it did not succeed." Gardiner had been impressed by the trip to Kent's Hill. He reminisced that he had "rarely enjoyed so pleasant and profitable a day as this day's ride with Bishop Potter."²⁰

The Manual Labor School at Readfield

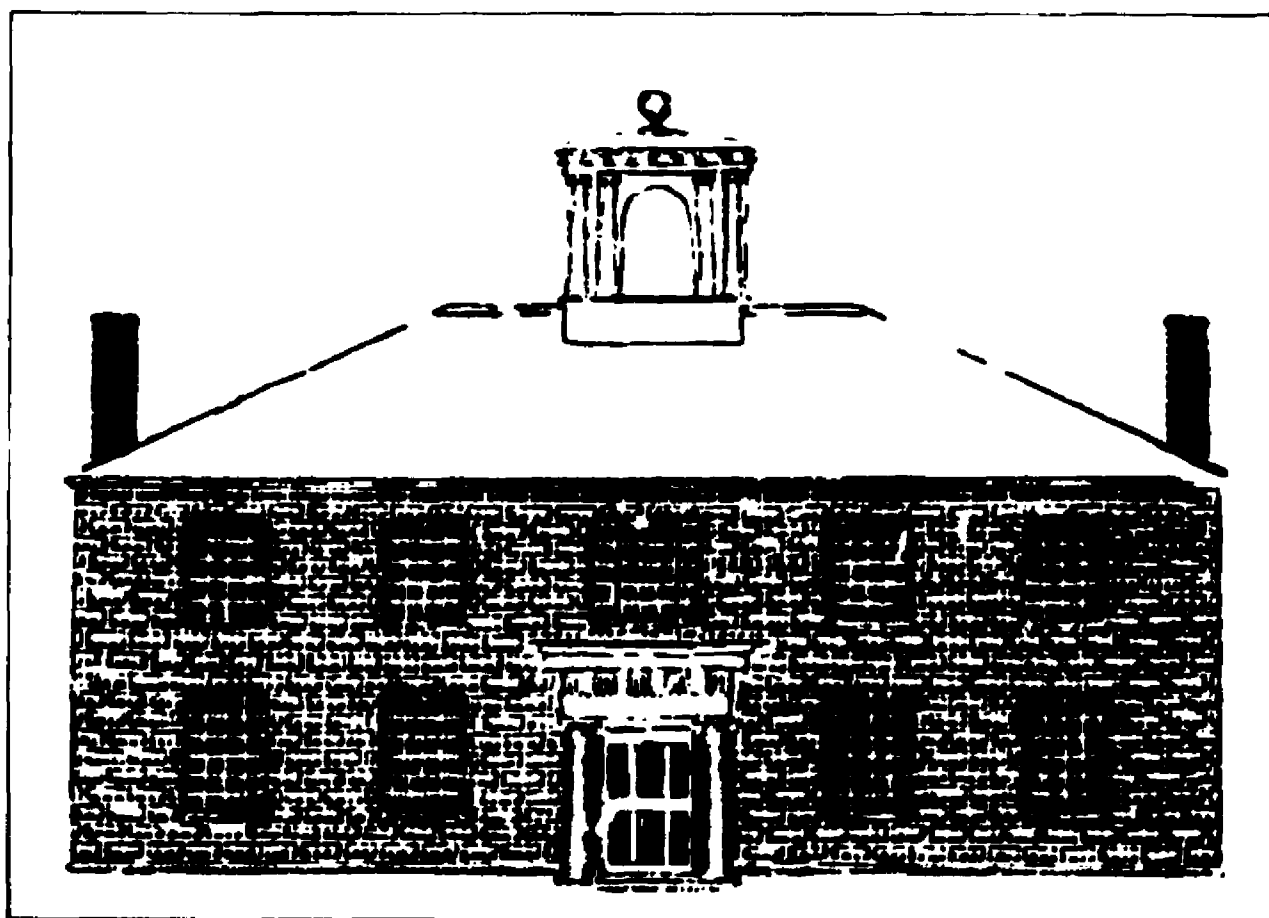
In 1823 Mr. Luther Sampson, a prosperous farmer who lived in the village of Kent's Hill, directed that a part of his ten-thousand-dollar donation "be applied to the establishment and for the benefit of a school to be located on the premises, in Readfield." The explicit designation included that the money was to be used for "instruction in the principles of experimental Christianity, theology, literature, and the practical knowledge of agriculture and the mechanic arts."²¹

The sponsorship of the Methodist school was in the hands of Readfield Religious and Charitable Society, and it was to the society

¹⁹Recollections, p. 143.

²⁰Recollections, pp. 143-44. Bishop Potter is also cited as a fighter for public schools by H. G. Good in History of Western Education, p. 415.

²¹Hall, op. cit., p. 204.



GARDINER LYCEUM. FROM AN OLD PRINT.

7. Gardiner Lyceum. Site of the first successful attempt in America at career education for farmers and mechanics. Gardiner, Maine, 1823. (After The Centennial of Gardiner, 1903).

that Sampson had given the ten thousand dollars. This society was incorporated in 1821 at Readfield. It is noteworthy that one of the trustees was "Abraham Morrill," perhaps a relative of Justin Smith Morrill, who is known as the founder of the Land Grant Colleges. J. S. Morrill had been born in Strafford, Vermont, in 1810 and had come to Portland, Maine, in 1828 to learn merchandising. The relationship is worthy of further investigation.

One complication in this entire affair lies in that Gardiner specifically says he went to "Kent's Hill, Readfield," not to Readfield itself where the school in question was located. Gardiner also made his visit prior to 1823 since he later remarked "afterwards I tried the experiment." The Gardiner Lyceum opened in January of 1823 but was planned in 1822. A study of the developments in the period probably would reveal a school at the village of Kent's Hill and another, more significant undertaking, rising later at Readfield under the same supervision. In May of 1824 the Society assumed the title Maine Methodist Society, and in December of the same year the name of the school was changed to Maine Wesleyan Seminary, the title by which it has since been recognized.²²

Other Happenings

Parallel events were taking place in New England. The Woodbridge School at South Hadley, Mass., announced that "Regular exercise is taken from one to two hours a day, in a workshop or garden.

²²Hall, op. cit., p. 219.

A farm is annexed to the establishment, such portions of which are necessary will be devoted to the uses of the school."²³ And in 1821 the National Gazette and Literary Register for April 21st carried a plan to set up a Fellenberg school in Pennsylvania. A possible stimulus for this movement appeared in the same paper a few days earlier; it was also reported that the Maryland Legislature was circulating a plan which would make available to public schools the funds derived from the sale of public lands.²⁴

Gardiner's school differed from these other schools in its explicit purpose "to prepare youth by a scientific education to become skillful farmers and mechanics." Gardiner himself pointed out that the term "Lyceum" had been chosen to distinguish it from a high school or college. In the colonial period one finds numerous institutions so named. The term originated in Rome as the name of a building or grove used for gymnastic exercises in Athens. Later it was given to Aristotle's school, whence it became famous. The "Lycaeum" of Delaware was meeting twice a month early in 1798. New York's "Lyceum of Natural History" opened in 1817, and Detroit's "Lyceum" began in 1818. A New Hampshire "Lyceum" at Wolfeboro began in 1820.

There was a general ferment of manual labor both for physical health as well as technical education. Yet the Gardiner proposal was significantly different from those of other Maine schools.

²³Quarterly Register, II, (1821) 234. Also quoted by L. F. Anderson, "The Manual Labor School Movement," Educational Review, XLVI (1913), 378.

²⁴John A. Dwyer, "Some Factors Influencing Public Opinion On Free Schools in Pennsylvania, 1800-1835," Doctoral Dissertation, Temple University, 1956, passim.

Gardiner wrote in the Recollections that he had noted the inability of farmers and mechanics to deal with occurrences outside the routine. "After reflecting much upon the subject, I became impressed with the belief that an institution might be established which would put the acquisition of so much science as was requisite to make skillful mariners, millwrights and other mechanics, within the reach of all who wished to follow these branches of business."

Gardiner's petition to the state legislature to incorporate the Lyceum, according to his Recollections, "states full the objects in view," and is here quoted in its entirety.

To the honorable the Senate and the honorable the House of Representatives of the State of Maine in Legislature assembled,

The petition of the subscribers represents that a donation has been offered of land lying on Kennebec River estimated at \$4000.00 for the purpose of establishing within said town a school for teaching mathematics, mechanics, navigation and those branches of natural philosophy and chemistry which are calculated to make scientific farmers and skilful mechanics.

And whereas it is an object of very great importance to any state, but especially one possessing fine rivers and a fertile soil, numerous mill sites and a coast indented with many and capacious harbours, to a state rapidly increasing in commerce, agriculture and manufactures that its artizans should possess an education adapted to make them skilful and able to improve the advantages which nature had so lavishly bestowed upon them, and whereas the State of Maine is in possession of these numerous privileges, yet while she has liberally fostered her colleges for educating young men for the learned professions, and possesses numerous academies for preparing youth to enter those colleges, and for making useful schoolmasters, she has hitherto omitted to make provision for giving instruction to her seamen, her mechanics, and her

farmers, upon whom the wealth and prosperity of the state mainly depend. The recent improvements in chemistry, which give the knowledge of barren and fertile soils, and the best mode of improving them, render the importance of a scientific education to her farmers much greater than at any former period.

Your memorialists would further represent that they consider the situation selected for this school extremely advantageous, from its central position in a populous neighborhood in a fertile country where provisions are abundant and cheap, where commerce is continually extending, and in a town possessing uncommonly fine mill sites and rapidly increasing in population. They would further represent that in addition to the donation above referred to, a sufficient sum has been subscribed for the erection of a convenient building for the above school, but as a considerable sum will be required for the purchase of instruments necessary for such a school, and as the fees of tuition in order to make the school generally useful must be much too low without the income of some permanent fund to give a comfortable support to a person adequate to the task of instruction, they must rely upon the patronage of the state for the power of carrying this plan into effect, notwithstanding the exertions that have already been made.

They would therefore pray your honorable bodies to incorporate a school for the above purposes, with a body of seven trustees with the usual powers and privileges, to be called the 'Gardiner Lyceum,' and to grant such aid as will enable the trustees to bring the school into immediate usefulness. Signed, R. H. Gardiner and 51 others.²⁵

²⁵The petition is reprinted here from the Recollections, pp. 205-06.

Gardiner's Philanthropy

The attitude taken by Gardiner toward the school is clearly one of general philanthropy. In fact, he spent the most of his lifetime and fortune on one or another form of industrial, educational, or literary activity aimed at the improvement of society. The underlying hope of the social utility of applied science at the Lyceum comes clearly to the forefront in Gardiner's "Address to the Public":

The practical utility of science cannot be doubted, in an age where its investigations have produced such astonishing improvements as in the present. There is scarcely an art, which has not directly or indirectly received from it important services, for science must necessarily be the foundation of every art.

With a view to furnish to farmers and mechanics the education here represented as so useful, the Gardiner Lyceum has been established; and the course of study will be arranged with particular reference to the wants of those classes, for whose particular benefit it was designed.²⁶

Thus did Gardiner intend the school for the laboring public. He conceived it as being another of his benevolent efforts at relieving the plight of the lower classes. Throughout his life Gardiner maintained the rigid class outlook and political orientation of staunch Federalism.

Interesting also, and an important factor setting Gardiner and Amos Eaton apart, is the decided difference in world view. Whereas Eaton's life centered entirely in the work of the Rensselaer Institute, Gardiner lived well, reporting the number of persons

²⁶American Farmer, V (1823) 217-18.

residing in his household, including servants, to be twenty-two in 1820. In 1824 when the Lyceum was strong, Miss Elizabeth Peabody, a transcendentalist, was tutor in his home. Gardiner seems rather pleased to have had a transcendentalist on the premises, but he remarks later that her thoughts were "obscure and cloudy."²⁷ Shortly before his death Gardiner reflected that the Lyceum "was only designed to give needful instruction to the labouring mechanic without raising him out of his position."²⁸ The relationship of Gardiner to his Lyceum is somewhat like that of Stephen Van Rensselaer's relationship with Rensselaer Institute.

The Curriculum at the Lyceum

Benjamin Hale's inaugural address also displays the marked vocational philosophy of the school.

There surely can be no reason why mechanics and agriculturists should not be instructed in that science which will enable them to follow their pursuits not blindly, but from rational views. Those who have not this education may indeed copy faithfully the practices of their fathers, but we cannot expect from them improvements which shall enrich their country and benefit the world.²⁹

The catalogue for 1823 reported that the Lyceum students would not be required "to study that, which will not be of material service

²⁷Recollections, p. 187.

²⁸Ibid., p. 211.

²⁹American Farmer, V (1823), 226-27.

to him...." This meant a free-choice of curriculum such as Jefferson later established at the University of Virginia. And to make possible the pursuit of such diverse subjects became a point of immediate practical concern in school administration. The problem was attacked by a combination of lectures, laboratory work, and individual supervised readings:

...in most cases, particular studies, such as the application of chemistry to the individual Arts will be pursued by one or two only.... Such students must pursue a course of reading as will be pointed out to them, and will be assisted by frequent Examinations and Explanation, and will have when necessary the liberty of experimenting.³⁰

The philosophy of the school was made widely known through publication of the early proposals, of Gardiner's "Address to the Public," of Hale's "Inaugural Address," and through publication of the catalogue and the results of annual examinations by the trustees, among whom several governors of Maine are to be found.³¹ In addition, Gardiner himself sent a copy of the "Address to the Public" to presidents Adams and Jefferson who both replied with a "civil answer approving the plan."

In 1827 the Lyceum is reported to have had three instructors (1) "a principal, who is professor of Mechanics, etc.," (2) "professor of Agriculture and Chemistry," and (3) "a tutor in Mathematics." The number of students enrolled in 1827 was forty--considerably less than in earlier years. The American Journal of Education reprinted the details of the curriculum as follows:

³⁰Quoted by Stevens, op. cit., p. 534.

³¹New England Farmer, III (1824), 29.

First Year. --Arithmetic, Geography, Bookkeeping, Algebra, Geometry, Mensuration, and Linear Drawing.

Second Year. --Trigonometry, Surveying, Navigation, application of Algebra to Geometry, Differential and Integral Calculus, and Agricultural Chemistry. Instead of the last mentioned study, Civil Engineering is pursued by those who prefer it.

Third Year. --Natural Philosophy, Astronomy, Political Economy, the Federalist, History, Mineralogy, Natural History, Natural Theology.

Besides the above, Blair's Rhetoric is studied during the first or second year, and the Evidences of Christianity, during the second or third. The students of the two higher classes are also instructed in composition and declamation.

In addition to the three regular classes, extra classes are admitted to pursue particular courses of study; viz: one in Civil Architecture; admitted in November, and instructed in Geometry, Architectural Drawing, the mechanical principles of Carpentry, etc:--a second in Surveying, admitted in September; a third in Navigation, admitted in September or May; a fourth in Chemistry, admitted in January; and a fifth in Agriculture, admitted in November, and instructed in Agricultural Chemistry, Anatomy, and diseases of domestic animals, and such parts of Natural History as are peculiarly interesting to the agriculturist. The first and fifth of the above classes continue about four months; the others, three.³²

Thus were three regular classes augmented by unique short courses in applied science. Keeping in mind that the Lyceum was now in operation for the fourth year we thereby recognize the curricula had already evolved into what probably was its most elaborate conception. Particularly interesting is the omission of so much considered essential to the curricula of the early nineteenth century. Languages, literature, and the arts are omitted as unimportant for the working man. "Natural

³²American Journal of Education, II (1827), 216.

Theology" and Paley's Evidences of Christianity are the only religious teachings. Blair's Rhetoric is seemingly added as a second thought.

The utilitarian aspects of such a curriculum were not left to the imagination of the readers, as usefulness became the central criterion for measurement of the appropriateness of a subject in the curricula. The annual bulletin makes this point clearly:

It is a constant object in the instruction at the Lyceum, to familiarise the students' minds with the practical application of their lessons. Surveying and Levelling are taught not only in the recitation room, but in the field; the pupil in chemistry is carried into the laboratory, and allowed to perform experiments; and the classes in Mechanics are exercised in calculating such problems as occur in the practice of the machinist or engineer."³³

Thus while Benjamin Silliman was trying to keep students from disturbing his apparatus in the lab at Yale,³⁴ and while Amos Eaton was having his pupils demonstrate experiments before groups at Rensselaer, the Lyceum simply had students to be "carried into the laboratory" and allowed to conduct their own experiments--a technique which has since proven itself far more effective.

Gardiner's Donations

Three-hundred and twelve acres of land fronting on the Kennebec River had been presented to the school by Gardiner, to which he subsequently added 122 acres. He valued the total at \$5,208.00. The

³³Ibid., p. 217.

³⁴Dirk J. Struik, Yankee Science in the Making (New York: Collier Books, 1962), p. 424.

act of incorporation was granted by the Maine legislature in January of 1823 and the school opened soon afterwards with twenty students. In 1824 fifty-three students enrolled and in 1825 the number rose to 120. State aid had been \$2,000 in 1823 and \$1,000 each year until 1831. In 1824 a "winter short-course" was announced in which surveying, navigation, architecture, and chemistry were to be taught. No languages were required or offered in these early years.

Gardiner suggested the school be closed in 1831 when state aid was terminated, but public demand for the school prompted him to personally pay much of the expenses for another year. In 1832 the Lyceum closed. The land for experiments had not been used and the deed was returned to Gardiner. When the school re-opened somewhat later, it was a typical high school for Maine, indistinguishable, seemingly, from the many other secondary schools of its day.

The Failure

Perhaps the teacher who did most of the direct work with pupils was Dr. Ezekiel Holmes, a graduate of Bowdoin College. Holmes had received a regular medical education and had distinguished himself in doing so. Gardiner recognized that a knowledge of chemistry, natural history and botany were needed and chose Holmes because of his medical background as well as his academic excellence. Holmes was an enthusiast of the agricultural revolution and the new philosophy of democracy. Upon termination of his service to Gardiner Lyceum he began to publish an agricultural newspaper which found a good public circulation and became known as The Maine Farmer.

Holmes lacked the aptitude for challenging interests and gaining his pupil's respect. Gardiner remarks

With considerable attainments, he wanted order and method to make those attainments available to the students. He never commanded the respect of the students, and I deemed it a very unfortunate circumstance for the institution that he had ever been connected with it.³⁵

Gardiner also attributes considerable weight to Benjamin Hale's resignation in 1827 as the determining factor in destroying the Lyceum. Hale had accepted a position at Dartmouth, and in Gardiner's words, "His loss was irreparable. He had identified himself with the institution, and associated its success with his own reputation."³⁶

The materialistic and economic orientation toward agriculture and mechanics at the Lyceum required many times the financial investment of a conventional school. This fact seems well enough known to the founders. They were convinced, however, that the reception of the school by the general public would be good enough that state aid could readily be acquired and maintained. After a short time in operation "jealousies were excited" and resistance and opposition from several sources was felt. First the academies and colleges foresaw the effect of loss of their own enrollments due to the appeal of the practical knowledge offered at Gardiner. Also, there was the "religious prejudice"--to use Gardiner's own expression.³⁷ Secondary and higher education were largely under the control of one or another sect. The

³⁵Recollections, p. 208.

³⁶Recollections, p. 209.

³⁷Recollections, p. 210.

Methodists, Baptists, and Presbyterians led in this respect. Gardiner notes, "They therefore combined against an institution which claimed no sectarian support." That state aid was being given to the un-religious enterprise created serious opposition. In this connection Gardiner notes that when Hale resigned, it "became evident that no further aid could be expected from the state."

After Hale, Mr. Lathrop was appointed but soon moved to a western college. Next came Mr. Luther Cushing. Already the school seems to have taken on a less-than-professional atmosphere. In Gardiner's words, "Both of these gentlemen were good scholars but neither of them felt that he had engaged in a business which was to continue for life, but looked forward to other professions."³⁸ When the state withdrew aid, Gardiner advanced twelve or thirteen hundred dollars for its continuance. When he afterwards declined to make further advances the experiment was finished.

In his study of the Lyceum, Neil Stevens places considerable emphasis on the resemblance between Gardiner's Lyceum and Jefferson's University of Virginia. The practical bent, the student self-government, and the inclination to the laboring classes, are common to both schools, the significant difference being that Jefferson meant to lift men out of the designation of "laborers" while Gardiner meant to make them more productive. Stevens, however, seems not to have been familiar with the ferment of the enlightenment, with Pestalozzi and Fellenberg and their influence. Utilitarian science and the philosophical

³⁸Recollections, p. 210.

deluge from the French Revolution are not brought into the discussion. It is necessary, therefore, to take exception to his implication that Jefferson copied the Lyceum in establishing the University of Virginia. Both schools grew from a movement much too broad-based, far too much a part of the intellectual and philosophical currents of the period to be viewed in so narrow a context. Gardiner and Jefferson did roughly the same thing because it seemed the thing to do. They knew something of each other's mind, works, and ideals. They agreed in some respects; they disagreed in others.

The Broader Picture

Under the head of the possible influence of all this on the Land Grant College movement we must recognize, within the frame of the foregoing discussion, that the Lyceum was at best only one of many such influences. When the Lyceum closed in 1832, Justin Smith Morrill was twenty-one years old. He could easily have known of the school from a dozen sources. Yet this is not important when we remember that the Lyceum was but one, albeit the earliest, of such institutions. The American Revolution and the French Revolution had done their work--"Liberty, Equality, Fraternity"--what followed is an echo; an echo we understand with more clarity today than was understood a century and a half ago.

That my new-fangled method is diametrically opposed to their ingenious schemes of the schools, I frankly confess. But which of these two ways, that learned or my unlearned one is the better, more rational and more conformable to common sense, is a question, the decision of which I shall trust to the sound understanding of every impartial and unprepossessed man....

--Joseph Neef
Sketch of a Plan, 1808

CHAPTER VIII

THE NEW HARMONY MOVEMENT

Characteristics common to the organizers of the early schools emphasizing the utilitarian value of scientific education are (1) personal wealth, (2) liberal religious views, and (3) philanthropy. These, it would seem, were coupled with a social urgency: a sense of un-easiness about the improvement of society. None of the founders of these schools are to be classified as contented people, as satisfied people or as religious fundamentalists. On the contrary, each seems to have been energized by compelling philosophical currents stemming from the Age of Enlightenment and from the American and French Revolutions; none were much pleased with the state of society; all were zealous in their determination to help usher in a new order. Orthodox religion generally, and Christianity explicitly were either viewed in a most liberal manner, as in the case of R. H. Gardiner, or were looked upon as negative forces of civilized existence, as in the case of Thomas Jefferson.

The New Jerusalem

The series of utopian undertakings transpiring at New Harmony, Indiana, from 1826 to 1828 constituted the peak of this trend. Robert Owen (1771-1858) and William Maclure (1763-1840) were wealthy, atheist philanthropists. In fact, both men suffered to some extent because of

opposition to their religious views. Such opposition was not personally disturbing to either of them--on the contrary--it convinced them of the urgency of their mission. Robert Owen felt that the religions of the world were the great obstacle to progress and so announced this to a large meeting in London on the 21st day of August, 1817. Making the declaration in a most dramatic fashion, he thought thereby to strike a death blow at superstition and bigotry. The "burst of heartfelt applause" which followed was, of course, rewarding, but most Londoners held a wait and see attitude.

In the United States Owen made a similar "Declaration of Mental Independence" in which he condemned private property, the control of organized religion, and the bondage of marriage ties. This was on July 4, 1826; America was mourning the death of Thomas Jefferson.

One might conclude that these views would have alienated Owen from the American people, yet the contrary clearly is true in a great many cases. This radicalism made the dream seem of great proportion. In 1824 he was asked to give two addresses before the Hall of Representatives at Washington, both of which were attended by the president. Again in April of 1829 he held public discussions at Cincinnati and dined with President Jackson and Secretary of State Van Buren. The hope for a new order, for a new world, was almost never opposed by men of influence.

William Maclure was even more anti-Christian than Owen. At the age of nineteen he came to America, made arrangements in the import-export business, then sailed to London. In 1796 he returned to America

and decided to become a citizen of Pennsylvania. Having accumulated a fortune in business, he became interested in science and popular education. Much impressed by geological discussions and by his travel in Europe just following the French Revolution, Maclure became a follower of Werner's classification and Pestalozzi's teaching. In 1809 he finished the first geological survey made in the United States and published the first truly geological survey map showing any part of North America, and one of the earliest in the world.

Finding little interest in educational reform in America, in 1819 he went to Spain where he bought ten thousand acres of land for an agricultural school for poor farmers. When the government was shortly thereafter overthrown, priests laid claim to his land, and Maclure fled back to America, wiser and poorer. Here he found recognition for his genius and the stability he needed. He was for twenty-two years president of the Academy of Natural Sciences of Philadelphia.

Maclure's Meeting with Neef

Back in 1804 and 1805 in Paris Maclure had met the Pestalozzian teacher Joseph Neef who was demonstrating for Napoleon the Pestalozzi method of teaching orphan children. Much taken with the procedure, Maclure offered to pay all of Neef's expenses to set up the new method in America. Neef accepted, moved to Pennsylvania, learned English, wrote a book, and opened a school in Philadelphia in 1809 at the Falls of the Schuylkill River where he created considerable interest in the new education. Neef's dedication to the principles of the French Revolution brought him undue criticism, and his thorough-going

non-conformity finally seems to have caused him to move his school farther from the city. His rationalistic educational techniques were indeed closely derived after Pestalozzi with certain refinements adapting it to the free world.¹ This, as was also the case with Pestalozzi, won him a reputation for teaching atheism to his pupils. Ethical and moral education Neef claimed to be of utmost importance, but of religious dogma, he said, "It is no part of my business." After the failure of these schools Neef retired to farming whence he was called by Maclure to New Harmony in 1826.²

Something of the magnitude and promise of the New Harmony experiment is reflected in the roll of the educated and the educators who came: Thomas Say, a zoologist, Charles Alexander Lesueur, naturalist and painter, Constantine Raffinesque, an ichthyologist, Dr. Gerard Troost, a Dutch scientist, Madame Fretageot, and Phiquepol d'Arusmont. All were Pestalozzians, free-thinkers, rationalists; they came to work for a new social order free of the inhibitions of the past.

¹Joseph Neef, Sketch of a Plan and Method of Education (Philadelphia: Printed for the Author, 1808), passim.

²Numerous biographical studies are available on Owen and his work; however, Maclure has few memoirs: S. G. Morton, "Memoir of William Maclure," American Journal of Science, XLVII (1844), pp. 1-17; see also American Journal of Education, XXX, p. 561 and C. L. and M.A. Fenton, The Story of the Great Geologists (New York: Doubleday, Doran and Co., 1945), pp. 124-32. For Neef's work see Will S. Monroe, "Joseph Neef and Pestalozzism in America," Education, XIV (1894), 449-61, and Kate Siler, Pestalozzi: The Man and His Work (London: Routledge and Kegan Paul, 1960), pp. 306-15.

See also the excellent treatment of Maclure's educational views by Charles Burgess, "William Maclure and Education for a Good Society," History of Education Quarterly, III (1963), pp. 58-76.

The Plan

It was a highly progressive plan of education they attempted at New Harmony. The need for education in geology, chemistry, mechanics, self-government, and in ethics outside religious dogma--all were brought to the front of their efforts. Three educated fierce non-conformists out to create a new society! The attempt could not be stimulated in America today, and, though they encountered no serious resistance then, the spectre of such an unorthodox and radical undertaking would today bring violence from a hundred sources in the land of the free.

The Classes

William Maclure was given charge of the educational efforts at New Harmony. All who participated in the experiment seem to have placed great importance and confidence upon the accomplishments of the schools. Owen himself, after the collapse of New Harmony, blamed Maclure for the failure not just of the educational community but asserted the educational failure caused the whole operation to fall.³ Early in 1826 Maclure outlined the Pestalozzi system of instruction in Silliman's The American Journal of Science.⁴ Perusal of Maclure's articles shows a racy utopian philosophy of pedagogics climaxed when he says:

³George B. Lockwood, The New Harmony Movement (New York: D. Appleton and Company, 1905), pp. 252-53.

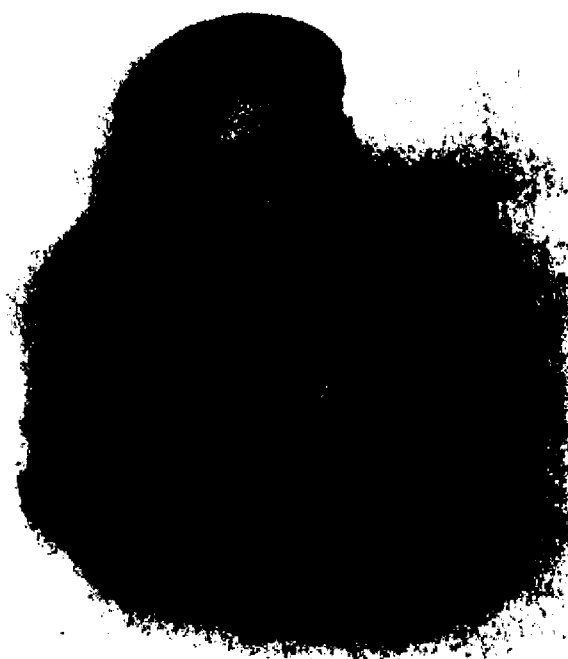
⁴American Journal of Science, X (1826), 145-50. See also: Maclure's essay in The New Harmony Gazette (1827).

Their [the pupils'] most complicated studies are but an amusement which increases with the difficulties they encounter; and this concatenation of pleasurable ideas with moral study never ceases, and is the cause of their being at school during their whole lives; and the progress of their knowledge and improvement finishes only in the grave.

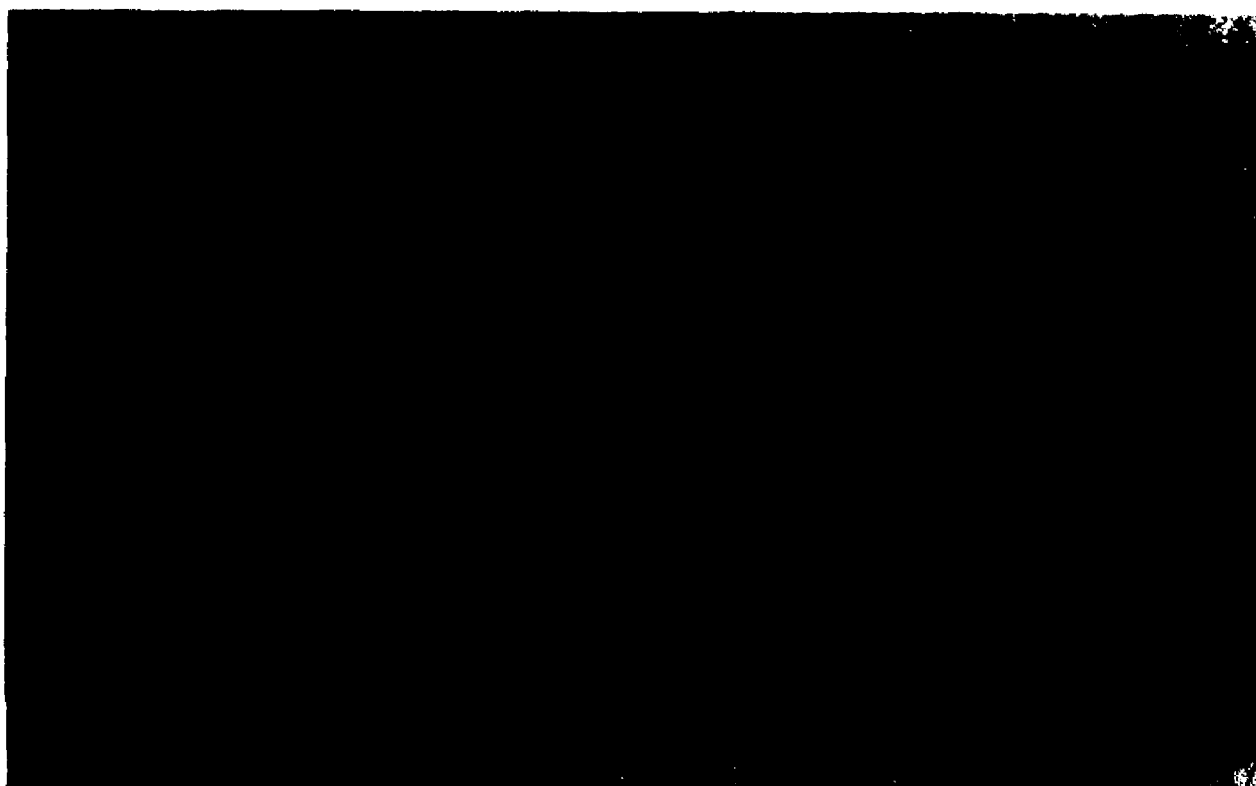
While he was no doubt much interested in agricultural scientific education, Maclure here says little of farming, but he does dwell upon the mechanical arts and chemistry saying, "The boys learn at least one mechanical art.... They learn natural philosophy by the most improved and simple instruments: chemistry by the latest and most accurate experiments...."

Not for lack of experienced teachers did New Harmony collapse. Neef had the experience aforementioned; Madam Fretageot had established her Pestalozzi school in Philadelphia in October of 1821, and Mr. Phi-quepal began his school in the early part of 1825.

The school at New Harmony was a boarding school, housing all the children of school age. With no religious education, and with a cynical attitude toward the Latin and Greek languages, the educators here were free to turn much of the attention of their pupils to the useful arts and sciences--and they did not fail to do so. But they had not the understanding of human personality dynamics necessary to carry through such visionary ends. Nor are we much better off today. New Harmony failed (1) because the parents did not see the results they had hoped for and been promised in their children, (2) because the adults were diverse and restless people, and (3) because too many families were taken into the community without reasonable selectiveness.



WILLIAM MACLURE



8. Above, William Maclure, Director of Education at New Harmony, Indiana. Below, Community House No. 2, the school at New Harmony. (After Lockwood, The New Harmony Movement, 1905).

SKETCH
James Cunningham
 OF
 A PLAN AND METHOD
 T. Ritchie Stone, M.D
 OF Washington, D. C.
 FOUNDED ON AN
 ANALYSIS OF THE HUMAN FACULTIES,
 AND
 NATURAL REASON,
 SUITABLE FOR
 THE OFFSPRING OF A FREE PEOPLE,
 AND
 FOR ALL RATIONAL BEINGS.
 BY JOSEPH NEEF,
 FORMERLY A COADJUTOR OF PESTALOZZI, AT HIS
 SCHOOL NEAR BERNE, IN SWITZERLAND.
 PHILADELPHIA: PRINTED FOR THE AUTHOR.
 1808.

9. Title page of Joseph Neef's first book. This was the first book published in America on pedagogy, 1808.

Lack of Criticism

One of the reasons for the failure at New Harmony was, paradoxically enough, the absence of sound critical evaluation from without or within. Newcomers to the method of education reacted by either labeling the whole system ridiculous or by enthusiastically agreeing in toto! Maclure himself noted "The only objection urged by the enemies of the system is, that it is impossible! The eternal cry against everything new...." The group seems also to have been peculiarly deaf to outside criticism. Largely European in their backgrounds, the majority were all too accustomed to emotionally derived denunciations. Joseph Neef probably best reflects the sentiment of the New Harmony group:

It is in vain, you attack me; all your reasonings and declarations shake me no more than the combined fury of the winds and waves move the sea beaten rock....

Nay, should the whole world conspire to proclaim my plan to be impossible, impracticable, unreasonable, chimerical.....I would not hesitate to declare the whole world to be.....fit for bedlam!⁵

When New Harmony broke up Maclure remained in the community and continued educational experiments. He published in 1827 the announcement of "Maclure's Seminary," and in May of the same year announced "The Orphans' Manual Training School" in which the children were to work seven hours daily to pay for their education. On January 16, 1828 he established the New Harmony Disseminator under the auspices of "The School of Industry" and an adult "Society for Manual Instruction"

⁵Joseph Neef, op. cit., p. 141.

which he said was really a mechanics' institution. Later that same year he retired to Mexico, broken by the failures, one by one, of his eagerly conceived experiments.

The Long Range Effects of New Harmony

The political reverberations from Owen's fantastic undertaking are quite complex indeed and not the subject of this inquiry. The educational effects, however, are more simple. The American intelligentsia had been closely watching the progress of the experiments. They had attitudes of reluctant approval and when all came to naught with the various experiments, the educational community as a whole became silent about the applied science in classrooms. Their imaginations had been fired but the broad failure of so many attempts set them unanimously to re-evaluate the problem.

At about this same time the "manual labor" schools lost much of their glamor and most of them ceased operation. By 1840 only a few experiments remained. Historian A. C. True notes the teaching of agriculture in elementary and secondary schools had at this time all but disappeared. Nevertheless, all these branches of applied science and of utilitarian education had established a foothold and had undergone preliminary testing. The urgency of the demands in the 1850's and 1860's to do something for the common man found models in experiments like New Harmony and Gardiner Lyceum. Americans in 1862 did not exactly copy these experiments but they moulded the idea to fit more closely their own visions.

The issue had now the support of a vast majority of people who had either been skeptical of the earlier experiments or who had

developed in the interval disillusion about the future of the common man in the free world. The free thinking and secular nature of the people behind the movement had been glossed over and for all practical purposes forgotten.

It is true that in 1860 the intellectual set was mostly against the idea of Agricultural and Mechanical Colleges. They had no misgivings about vocational education. For them the only way civilization could improve was through science, literature, art, and philosophy. It was the same with individuals as with society, and persons unable or unwilling to surmount this slippery many-sided obstacle were unfortunate. Yet at the same time a goodly part of the pedagogic group and more than a few political figures were ready to do something, anything, to carry through with the long overdue hopes of a less brutal life for the lower classes.

Europe was not, meanwhile, silent. The many experiments taking place there were noticed, admired, published, and copied. But that is another story.

...Freemen have the unquestionable right, nay, it is their duty to defend their freedom, as well as their other rights against any lawless aggressor; they ought therefore, to study the horrible art of destroying and killing those two-legged beasts, that may be induced or compelled to come and destroy them.

--Joseph Neff
Sketch of a Plan, 1808

CHAPTER IX

MILITARY SCIENTIFIC EDUCATION AT WEST POINT

Science, as a vaguely conceived natural philosophy, was very much in the air of North America in 1800. Yet its applicability to the common purposes of life remained more or less a matter of faith until mid century. No industry existed. Agriculture had changed little in the last thousand years. Seeds of change were, surely, in the air, but technology was in its gestation period. There were no iron bridges, no steam engines or railroads, and no canals. Indeed, there were no engineering projects of significant magnitude during the first quarter century. It was a raw frontier that faced the sparse American population.

West Point

Congress envisioned the production of "a few engineers and artillerists as needed" when it passed legislation to organize a military school at West Point. President Jefferson, as is well-known, was completely captivated with the idea of scientific institutions in the new world. He was also sympathetic with a broad-based military training. Writing to James Monroe on June 19, 1813 shortly before Monroe became Secretary of War under Madison, he says

... it is a subject of joy that we have so few of the desperate characters which compose modern regular armies. But it proves more forcibly the necessity of obliging every citizen to be a soldier; this

was the case with the Greeks and Romans and must be that of every free state. ...We must train and classify the whole of our male citizens, and make military instruction a regular part of collegiate education. We can never be safe until this is done.¹

Jefferson, however, favored the encouragement of scientific investigation and learning which would definitely not be limited to the science of war. He therefore chose Major Jonathan Williams, a learned and scientifically bent individual, to serve as the "principal engineer" for organizing and activating the new West Point Academy in 1802.² Williams hoped to instill a spirit of scientific inquiry, a degree of literary bent, and a broad comprehension of the horizons open to military men in the new world.

Apparently no one except Jefferson and Williams recognized the gravity of the situation, and after his West Point work was relegated to a position of inferior prestige and importance in 1803, Williams indignantly resigned his commission. The academy suffered so badly that he capitulated in 1805, but conditions were not much improved. Under Williams the curriculum was heavy with scientific studies. In defense of the emphasis on science, Williams urgently asserted in 1802

...Science is in its own nature so diffuse, that it is almost impossible to designate any dividing lines.

¹A. E. Bergh, ed., The Writings of Thomas Jefferson (Washington: Jefferson Memorial, XIII, 1907), 261.

²The story of West Point's early history is told by Thomas Elliott Shaughnessy in his Doctoral Dissertation: "Beginnings of National Professional Military Education in America, 1775-1825," John Hopkins University, 1956, 222 pp.

Astronomy, geography and mathematics run into each other at every step. Chemistry and mineralogy are inseparable. The laws of motion, mechanics and projectiles are also interwoven and in some way or other (although the extreme points may be distant) the gradations become insensible. Military science embraces all these branches.³

But West Point was allowed to slip until on June 18, 1812 when war with England was declared, there was no one at the Academy; what is more, it did not go into operation until April of the next year.

Partridge

As the school reorganized, Captain Alden Partridge became the guiding hand in the curriculum. A well read man who had already published several scientific papers,⁴ Partridge directed the school along a modern and liberal educational plane. In 1820 he was advocating that education of the people should be along such practical lines as "agriculture, commerce and manufactures" in addition to "physical training" in the vein which became popular a decade later. But Partridge envisioned West Point as an institute of high academic excellence, not as a training ground for technicians either in engineering or in the science of war. His curriculum included only the sciences of "natural and experimental philosophy, astronomy, and engineering," all in the third year of study. When Sylvanus Thayer⁵ took over in

³Shaughnessy, op. cit., p. 128, quoted from S. Forman, The Educational Objectives of the United States Military Academy, U. S. Military Academy Library Bulletin #2, p. 29.

⁴Shaughnessy, op. cit., p. 191, lists several of Partridge's published works.

⁵Thayer graduated from West Point in 1808 and studied engineering in France in 1815 and 1816 (Ecole Polytechnic).

1819 the subjects of geology, chemistry and mineralogy were added. Generally, however, the school's curriculum remained a curious mixture of military, scientific, and academic study.

Partridge apparently sensed the importance of such a curriculum, later founding the American Literary, Scientific, and Military Academy in Norwich, Vermont in 1819, two years after leaving West Point.⁶ While there was considerable emphasis on literary and military education, no small position was given to science "for the common purposes of life." This was to later become the cry of every school established on behalf of farmers' and mechanics' sons.

In spite of the absolutely chaotic manner of operation into which Congress forced West Point in the early years, its graduates seem to have distinguished themselves quite well. None of the works constructed by a graduate of West Point was captured by the enemy in the War of 1812. As peace once again settled over the states, they formed a hard and tried band of military engineers who spread over much of America to become the cutting edge for civil engineering.⁷

Neef's Military Training

Little is known of Joseph Neef's emphasis on military training. He himself had been wounded in service under Napoleon and, when he

⁶Palmer C. Rickets mentions this founding in his survey of engineering schools related to Rensselaer: History of Rensselaer Polytechnic Institute, 1824-1934, 3rd edition (New York: J. Wiley & Sons, 1934), p. 6.

⁷Shaughnessy, op. cit., passim.

organized his school on the Schuylkill River in 1808, he indicated he would form a "little company" in order to study "the horrible art of destroying and killing" as well as self defense.⁸ Neef's attitude toward the military was scarcely conducive to an engineering education as his emphasis was more on a "rational" training after Pestalozzi and Rousseau. Neef shocks us into an understanding not only of his attitude toward war but also of his attitude toward the new world when he exclaims: "Do not infer, however, that I advocate, or even insinuate the expediency of standing armies, a superfluous navy, unnecessary fortification, national debts, and permanent taxes, and such other state machinery." "...these very establishments would be the harbingers of thralldom, ... they are just as compatible with real freedom as consciousness of guilt is compatible with a good conscience."⁹ But Neef was a curiosity in other ways, too.

An Overview

The influence of the scientific aspects of the curriculum at West Point has received little attention.¹⁰ Shaughnessy refers to it occasionally but has made no attempt to follow the graduates so as to ascertain their contributions to the industrial revolution or

⁸ Joseph Neef, Sketch of a Plan and Method of Education (Philadelphia, 1808), p. 106.

⁹ Ibid., pp. 107-08.

¹⁰ The historian Henry Adams attributes "the sudden development of scientific engineering in the United States" to West Point and thus is a happy exception. The Formative Years: A History of the United States, 2 vol. (Boston: Houghton Mifflin Co., 1947), Vol. II, p. 1027.

to education.¹¹ Enough is known to suggest that the influence must have been great. The time was right for early attempts to apply science to everyday problems not just as a personal recourse or as a panacea for social ills, but as a matter to be taught in schools and universities across the nation. Neef's genius was such that he made too many people recoil from careful consideration of his ideas but West Point clearly was laying the pedagogic groundwork for technical education of the next generation. The pressures from Congress for a training of a few happy warriors "as needed" put pressure on the theoretical parts of the science curriculum, making of it one of the first American schools to unite theoretical with applied science.

¹¹See Dirk J. Struik, Yankee Science in the Making (New York: Collier Books, 1962), pp. 313-16 for a slight discussion of West Point graduates in engineering careers.

The husbandman is in honour there, and even the mechanic; because their employments are useful. The people have a saying that God Almighty is himself a mechanic, the greatest in the universe; and He is respected and admired more for the variety, ingenuity, and utility of His handiworks, than for the antiquity of His handiworks.

--Thomas Cooper
Some Observations
Concerning America, 1794

CHAPTER X

THE UNIVERSITY OF VIRGINIA

Thomas Jefferson's interest and influence in science generally and in utilitarian science specifically is no secret. In 1776 Jefferson, serving as a member of a legislative committee, proposed a general system of education for the whole state, including "primary schools, academies and colleges, and an university." But, of course, only the first of these was established at public expense, and the passage of that came two years later. The absurdity of the entire undertaking became evident when the law proved to be inoperative because the matter had been left optional with the county courts.¹

The plan Benjamin Rush presented to the legislature of Pennsylvania in 1786 was substantially the same one Jefferson had presented to the Virginia legislature.² Both were comprehensive systems of public free education, and both were rejected.³

¹Early History of the University of Virginia as Contained in the Letters of Thomas Jefferson and Joseph C. Cabell (Richmond: J. W. Randolph, 1856), p. xvii (Introduction).

²Benjamin Rush, A Plan for the Establishment of Public Schools and the Diffusion of Knowledge in Pennsylvania; Addressed to the Legislature and Citizens of the State (Philadelphia: 1786).

³Rush was a widely known and talented medical doctor. See Nathan G. Goodman, Benjamin Rush; Physician and Citizen (1746-1813) (Philadelphia: University of Pennsylvania Press, 1934), 421 pp.

Jefferson finally gave up the idea of getting an easy commitment from the legislature for education. Almost fifty years passed between Jefferson's first proposal and the opening of the University of Virginia in 1825. Free public education was reserved for the next generation to accomplish.

An enthusiastic proponent of science in agriculture, Jefferson collected a fine agricultural library and designed one of the better type moldboard plows. His notes on agricultural science at Montecello are widely appreciated.⁴ His scientific interests also came into play in the organization of the curriculum at West Point as well as generally asserting the need for military training in colleges. After the disappointing outcome of his efforts at establishing an institution of scientific excellence at West Point he renewed his energies toward the University of Virginia.

With so many years of waiting sentiment became strong to take what money was at hand and construct as sufficient an institution as could be had. But Jefferson would have no part of it. In December, 1822, he wrote to Cabell:

The great object of our aim from the beginning, has been to make the establishment the most eminent in the United States.... We have proposed, therefore, to call to it characters of the first order of science from Europe as well as our own country; and, not only by the salaries and the comforts of their

⁴Everett E. Edwards, Jefferson and Agriculture, USDA Agricultural History Series No. 7, 1943, passim.

situation, but by the distinguished scale of its structure and preparation, and the promise of future eminence which these would hold up, to induce them to commit their reputation to its future fortunes. Had we built a barn for a college, and log huts for accommodations, should we have ever had the assurance to propose to an European professor of that character to come to it?.... To stop where we are, is to abandon our high hopes, and become suitors to Yale and Harvard for their secondary characters to become our first.⁵

Funds

Jefferson's greatest difficulty in establishing the university he wanted was in raising funds for so grandiose an undertaking. A lack of finances prevented earlier establishment. The germ of the university was an incorporated academy legally chartered to be established with funds raised by a lottery and by private subscription. The school, briefly known as Central College, began actual operation under the name of the University of Virginia and opened for students in the spring of 1825.

Religious Trouble

William and Mary officials, and the clergy generally, looked upon Jefferson's scientific utopia as an opponent. Since there was to be no religious training in the school itself, considerable rumblings developed as the movement began to take form. Cabell wrote to Jefferson in 1821 saying:

⁵Early History of the University of Virginia, op. cit., p. 260.

You, doubtless, observe the movements of the Presbyterians at Hampden Sidney, and the Episcopalians at William & Mary. I learn that the former sect, or rather the clergy of that sect, in their synods and presbyteries, talk much of the University. They believe, as I am informed, that the Socinians are to be installed at the University for the purpose of overthrowing the prevailing religious opinions of the country.⁶

These objections grew partly from the employment of Dr. Thomas Cooper, a brilliant and versatile scientist who had fled to the United States with Priestley. Dr. John Rice, Presbyterian clergyman and editor of a literary and religious periodical in Richmond, publicly declared his opposition to Cooper on the basis of Cooper's liberal religious views.⁷ Although Jefferson and Cabell both deplored the application of a religious test to the employment of a scientist, pressure became too great and Dr. Cooper was quietly compensated and dismissed. Jefferson also announced that the religious groups could establish facilities adjoining school property and engage the students there during released time for religious services.⁸ This quieted the opposition adequately. Cabell wrote in 1823: "I think also that your suggestion respecting the religious sects has had great influence. It is the Franklin that has drawn the lightning from the cloud of opposition."⁹

The violence thus perpetuated upon academic freedom hurt Jefferson more than was evident immediately. He reflected upon the

⁶Ibid., p. 215.

⁷Ibid., pp. 234-35.

⁸Ibid., p. 236.

⁹Ibid., p. 273.

Presbyterian attempt in subsequent letters, some of which were published.

An extensive note appended to the Jefferson-Cabell Letters of 1856 finds in favor of the Presbyterians on the basis that Cooper was objectionable to many of the religious groups who, by reason of the school's being state supported, were obliged to pay for the professor's services.¹⁰ A re-evaluation of the entire matter certainly seems in order. Religious opposition, it should be noted, also helped bring about the collapse of Gardiner Lyceum in Maine, of Neef's school on the Schuylkill River, as well as being involved in the cold attitude many Americans took toward the New Harmony experiment.

The Influence

While Jefferson made no pretense about the pragmatic character of the curriculum at the University of Virginia, saying it was to be attended by farmers, mechanics, carpenters, etc., he found it difficult to put his somewhat ethereal concepts into classrooms. The entire science of agriculture which he had so long pronounced as a matter of great educational importance was relegated to being taught by the professor of chemistry. Thus Jefferson's influence is most important in the years before and during the final establishment of his school. It was what he attempted to do that impressed and changed men. By the time he carried his plans into effect much of his influence and all of his life was spent.

¹⁰Ibid., pp. 233-36.

The history of the human mind, though no less confused than other kinds of history, presents a series of efforts to think scientifically, each of which proves so unsuccessful that it is followed by a period in which feeling is held superior to logic. There is an irregular alternation between cool, responsible, objective thought, and warm, hasty, subjective emotion. Man's reason is so emotional, and his emotions so cerebral, that the slow revolutions of this cycle are difficult to trace. The transition is most evident in the eighteenth century, when the Enlightenment, corrupted by its own ambition, melts into romanticism.

--Hoxie Neal Fairchild
The Noble Savage, 1928.

CHAPTER XI

AGRICULTURAL EDUCATION IN SOUTH CAROLINA

The Lethe Agricultural Seminary

The April, 1787 issue of the Columbia Magazine or Monthly Miscellany (Philadelphia) routinely published an idealistic and far-reaching proposal about education in a land such as America. "A Plan for Establishing Schools in a New Country, Where the Inhabitants Are Thinly Settled and Whose Children Are to be Educated with Special Reference to Country Life" was a remarkably descriptive title for an original and thoughtful piece the author of which remains unknown. We do know the work was read by John de la Howe, a French Huguenot and practicing physician who came to the United States in 1760 and settled at New Bordeaux in South Carolina.

In Howe's will, executed in 1797, reference is made to the article as the outline to be followed in arranging for an agricultural school for educating "and also lodging, feeding and uniformly clothing twelve poor boys and twelve poor girls."¹

Howe must surely have been acquainted with the "Charity School for the Poor" established by the Winyah Indigo Society of Georgetown

¹Howe's will has been published in part by Edgar W. Knight, A Documentary History of Education in the South Before 1860 (Chapel Hill: University of North Carolina Press, 1953), IV, pp. 72-73. See George W. Patrick, "Manual Labor Schools in the South: A Documentary History," Unpublished Master's Thesis, University of North Carolina, 1948, pp. 1-5.

in 1753. The Charity School was attended by "the farmer, the planter, the mechanic, the artisan, the general of armies, lawyers, doctors, priests, senators, and governors" and for about a century remained the only school between Charleston and the North Carolina line.²

Howe's school differed from the charity school in that Howe set up a curriculum adapted to young people destined for "country" life and in which physical labor was connected with a curriculum in the agricultural industries. The only significant change made in the original plan as published in the Columbia Magazine was the decision made by Howe to teach "twelve poor boys and twelve poor girls." While the article clearly presents the proposed educational plan as appropriate for all who are to live in thinly settled areas, Howe interprets the plan as one suited for the poor and for orphans. The charitable attitude which he had in mind is further evident in that he did not establish the school while he lived, apparently feeling that some egotism might be suggested in so doing.

The original estate of some six thousand dollars had grown to over ten thousand by 1826. Originally the school was set up and operated by the Agricultural Society of South Carolina but later was turned over to the state legislature in 1805.³ It is now known as the Lethe Agricultural Seminary.

²The Winyah Indigo Society, A Short History of the Winyah Indigo Society of Georgetown, South Carolina, 1755-1950 (1950), pp. 3-5. See also Legrand Iris Yarborough, "A History of the Early Teaching of Agriculture in South Carolina," Doctoral Dissertation, University of Florida, June, 1956, passim.

³The eccentric personal life of Dr. Howe, along with a description of the more recent state of the institution is to be found in an article by W. D. Workman, Jr., "The Frenchman's School," South Carolina Magazine, II, No. 1, (Jan., 1948), pp. 5, 21.

The Pendleton Labor School

The Pendleton Farmer's Society was organized in 1815, several years after the Philadelphia Society for the Promotion of Agriculture and the Agricultural Society of South Carolina (1785). Yet the Pendleton Society was fourth in the nation⁴ and active in the organization of a "Labor School" on a farm four miles from Pendleton in 1825 wherein boys were taught "how to grow crops, to do carpenter's work, etc." Unlike Wherli in Switzerland, "75 of the worst boys in the country" were sent to the school--causing a sudden failure.⁵

Other Agricultural Interests in South Carolina

In 1785 South Carolina founded its first agricultural society and in 1823 its eleventh. A group of active gentlemen farmers clearly dominated all aspects of life in the early years of South Carolina. The Agricultural Society of South Carolina organized only a few months after the Philadelphia Society, indicating the presence of sentiments favorable to these developments. A mistake would be made, however, if one considered this group to be a parallel with the northeastern seaboard states. In most respects, Dr. Howe's "poor" school notwithstanding, the philosophical refinements of the idea of popular education, of education in agriculture and the industries, and of agricultural societies and farming methods were cases in which South Carolina was following the fast moving activities of the northeast

⁴Yarborough, op. cit., p. 22.

⁵Benjamin Sloan, "Wholly Reminiscent," Pendleton Farmers' Society (Atlanta: Foote and Davis Co., 1908), pp. 56-62.

and of Europe rather than leading. The rapidity with which news came to South Carolina is indicative of a lively interest but action was often slow. After the failure of the Labor School at Pendleton in 1825, the next school announced was Cokesbury Manual Labor School in 1835. About the same time Furman Seminary of manual labor was founded (1836), the manual labor movement was in sharp decline over much of the United States.⁶

⁶Cokesbury and Furman schools are described in Patrick, op. cit., pp. 132-39.

But who will remember us or our labors for half a century? which is but two years longer than I have already lived. Who will remember the beneficent Stephen Van Rensselaer? The myriads of ambitious mortals who have preceded us are forgotten. So we of the present generation who are wearing down our strength in climbing precipices and descending caverns, cannot hope to be remembered but a few years.

--Amos Eaton
Geological Journal D, 1824

CHAPTER XII

THE RENSSELAER SCHOOL

Some Backgrounds

America in 1820 was experiencing the first genuine pangs of nationalism. The war was well over; the frontier was vast, splendid, and fearsome. New England was eager to develop a culture, a way of thinking and living, which would be commensurate with the high ideals upon which the United States of America had been founded. Agitators for educational reform intensified their work and found a swelling tide of favorable sentiment. The decade of the 1820's saw a number of significant educational activities among which we find the "American Lyceum" movement, the "Manual Labor" movement, early efforts toward a public school system, organization of numerous female schools, the publishing of numerous texts (some in science) designed for the "popular" classroom, and the first schools for teaching science applied to the "common purposes of life" for the sons and daughters of farmers and mechanics. Amos Eaton was an educator and scientist whose life was involved with several of these phenomena.

Eaton's Early Years

Born in 1776 Eaton, by his own count, was just forty-eight days older than the United States. He was a precocious child by any measure. On July 4, 1790, he was selected to deliver an oration and during the

same year he began to work for a blacksmith where he started surveying, "doing little jobs of surveying in the neighborhood."¹ Young Eaton received a classic education, entered Williams College in 1795, and was graduated there in 1799 after having been fortunate enough to be tutored by Jeremiah Day, later President of Yale College.² At the age of seventeen young Amos had prepared the manuscript (on surveying) for his first book.

Eaton is reported to have studied under Alexander Hamilton and was an intimate associate of Washington Irving. He was admitted to the bar at the age of twenty-six and for a time operated a promising business as a lawyer and land agent.

In a miscarriage of justice he was sentenced to life imprisonment in 1811 for forgery, but received a pardon after serving four years. In 1816 he presented himself at New Haven where he studied closely with Benjamin Silliman and Eli Ives at Yale.

Silliman was engaged in lectures in geology and chemistry which Eaton attended regularly for some time. Leaving Yale, from 1817 to 1824 Amos Eaton wandered from place to place through New York and the New England States surveying and lecturing, and collecting and classifying rocks.

¹The best biography of an american scientist is Ethel McAllister's Amos Eaton: Scientist and Educator, 1776-1842 (Philadelphia: University of Pennsylvania Press, 1941), pp. xiii, 587. This work is used for all references except where otherwise indicated.

²Jeremiah Day also became involved in the new education. He was Vice President of the important Manual Labor Society formed in 1828.



10. Amos Eaton, founder of the Rensselaer School, 1825, in Troy, New York. (Courtesy the Rensselaer Polytechnic Institute.)

The bankrupt lawyer, ex-convict, and back-woods lecturer was unable to break into the University monopoly on teaching positions of a scientific character. Although ridiculed for "going around with chemistry" he had a serious and far-reaching interest in science. History records that Eaton was a member of the Lyceum of Natural History of New York; the Troy Lyceum of Natural History; the Hudson Lyceum; the American Geological Society; the American Geographical Society; Albany Institute, and the Academy of Natural Sciences of Philadelphia.³ Because of his interest in botany he had produced The Young Botanist's Tablet of Memory in 1810; A Botanical Dictionary and a Manual of Botany for the Northern States in 1817. In 1818 he successfully presented himself as a student of geology when he published An Index to the Geology of the Northern States, and in 1821 his practical bent and itinerant lectures in chemistry prompted him to publish a Chemistry Notebook for the Country Classroom, an elementary treatise for what he called the "popular" classroom.

Stephen Van Rensselaer

Into Eaton's life came the opulent Stephen Van Rensselaer who had inherited a tract of land approximately twenty-four miles wide and forty-eight miles long⁴ on which he employed from sixty to one hundred thousand tenant farmers by 1838.⁵ Rensselaer was president

³McAllister, op. cit., p. 182.

⁴Ibid., p. 365.

⁵Stewart H. Holbrook, Dreamers of the American Dream (New York: Doubleday and Co., Inc., 1957), pp. 134-35.

of the Albany County Agricultural Society in 1821⁶ and president of the Board of Agriculture of New York in 1820.⁷ His broad philanthropic interests are generally known and certainly were not overlooked in his day.⁸

From Albany, Elkanah Watson, who is credited with originating the agricultural fair, wrote to John S. Skinner, editor of the American Farmer, in December of 1822 concerning an offer of the Hon. Stephen Van Rensselaer to give a farm of 200 acres, near the city, "well adapted to the object of an agricultural school and model farm." To this Watson added the comment "This noble and magnanimous offer of Mr. Van Rensselaer, in connection with his annual donation of Five Hundred Dollars, to the Albany County Agricultural Society, will entitle him to the gratitude and respect of the community and consign his fair name to posterity."⁹

Among the various things Eaton had done for a livelihood in these years, one was to survey the land along the Erie Canal for Rensselaer. Eaton was aware of Rensselaer's beneficence and turned first to him after conceiving a plan for preparing itinerant lecturers for rural villages. In the summer of 1824 on the back of a circular

⁶American Farmer, III (1821), 274-75.

⁷A. C. True, A History of Agricultural Education in the United States, 1785-1925, U.S.D.A. Misc. Pub. No. 36, 1929, pp. 24-25.

⁸McAllister, op. cit., p. 366 and passim.

⁹American Farmer, IV (1823), 366.



11. Stephen Van Rensselaer, philanthropist and promoter of agricultural and mechanical science. (Courtesy Rensselaer Polytechnic Institute.)

entitled "Operative Chemists" which he had himself published, Eaton wrote to Rensselaer and within six weeks had enlisted the powerful support of one of the most influential men in America.¹⁰

The School at Troy

The circular here mentioned contained a detailed prospectus for the teaching of Eaton's lecturing techniques to "young gentlemen who have received professional degrees, but have not located themselves in business." Eaton had for years given courses of lectures in the villages of New England and New York where he cleared an adequate, but not large, income. His attractive powers were great due to his natural talents and since the only serious competition he met for the interests of the populous was the occasional revivalist.

We have no record of the events or thoughts transpiring in Eaton's mind which led to his decision to begin the school except that he was much concerned that the fruits of science be made available to the people. He appended an important note as a part of the original printed circular as follows:

N.B. The above is intended as a preparatory step towards a course of instruction for the general application of science to agriculture and the arts. Want of operative chemists, who can work with cheap apparatus, is, at present, an unsurmountable obstacle to those extensive views of general utility, which have long been cherished by our public benefactors.¹¹

¹⁰McAllister, op. cit., pp. 357-71.

¹¹This circular is included in McAllister, op. cit., p. 358a.

Thus did Eaton, at least in the back of his mind, have the intention of following his simple course in chemistry with a more significant undertaking--"for the application of science to agriculture and the arts"--words very popular in the printed media of the day.

Eaton intended to prepare speakers for lectures to be delivered to popular audiences in rural New York and New England. He said plainly

My principal object is, to qualify teachers for instructing the sons and daughters of farmers and mechanics, by lectures or otherwise, in the application of experimental chemistry, philosophy and natural history, to agriculture, domestic economy, the arts and manufactures.

And so, on this head, Eaton rather anticipated the growing but not yet manifest interests leading to the broad movement which arose in the later 1820's and was known as "The American Lyceum."¹²

Himself surprised by the flurry of interest in his undertaking, Eaton wrote to Rensselaer shortly after the school began in 1825 saying he did not expect so much excitement and zeal for such a course of instruction. "I approach the duties with more diffidence than I ever approached any other undertaking. I am almost frightened at the letters &c. which I daily receive."

The First Students

Thirty students, it was planned, would constitute the first enrollment. The cost per student, Eaton had said would be about sixty

¹²The Lyceum was another attempt to bring learning of a practical or "useful" nature to the rural community. Much of its content was in agricultural and geological surveys, geology and chemistry. See Carl Bode, The American Lyceum: Town Meeting of the Mind (New York: Oxford University Press, 1956), passim.

dollars. Yet when the time came to begin school Eaton turned most of the students away until summer and wrote to Rensselaer "I really dared not venture to commence this new plan with more than 10 or 12." On January 3, 1825 at the Old Bank Place in Troy, Eaton's new school signed up six students at the rate of ten dollars for the term. Several hundred dollars from Rensselaer had provided the apparatus and chemicals but above all this, Eaton was still rather dependent upon Rensselaer for his own welfare--a conditions which pained Eaton's independent nature.

The Question of Originality

In the 1820's as well as today, the question of the originality of Eaton's innovations was one of controversy. Any direct influence by the reports about Fellenberg's work in Switzerland is non-existent. Eaton most assuredly knew of the Howfyl arrangements but he in no way intended to copy. He early remarked that he preferred his method to the Fellenberg plan because his better placed the "advantages of useful improvement equally within the reach of all."¹³ Rensselaer himself denied any relationship of his school to Fellenberg's plan and claimed originality, saying he had improved upon Fellenberg, "at least for our country."¹⁴ In March of 1828 Eaton severely denounced the Swiss school and reported that Fellenberg had himself "abandoned it."¹⁵

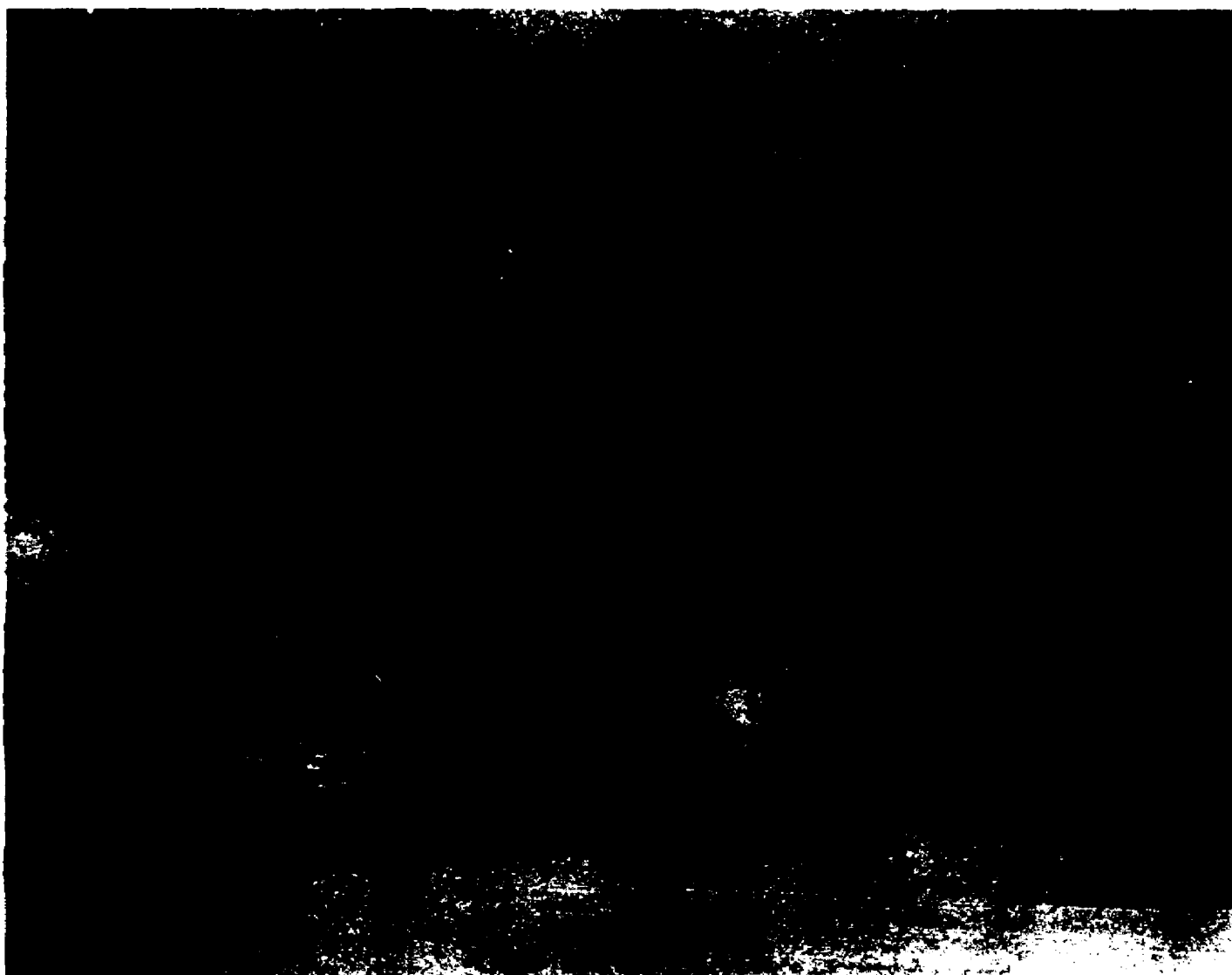
¹³McAllister, op. cit., pp. 368-69.

¹⁴Ibid., pp. 379-80.

¹⁵American Farmer, X (1828), 17-18.

There was, indeed, a great deal of difference in Fellenberg's school and Eaton's school. Fellenberg brought in the sons and daughters to his school where they were to be given a practical education of useful knowledge whereas Eaton was attempting to prepare teachers to give lectures and demonstrations in villages to mixed audiences, stressing the experimental and laboratory techniques of teaching useful science to working groups in society. Eaton took no notice of the classes of society while Fellenberg arranged special courses for upper, middle, and lower groups. In Switzerland students paid their way or worked for the school; at Rensselaer school students were not expected to work to pay their way until almost ten years after the school had been in operation. Fellenberg took mostly children whereas Eaton sought and often got professional people or college graduates.

Equally belabored has been the point of the originality of Easton's teaching method in which each student was given a full complement of chemical apparatus and expected to perform and explain experiments himself before the group. This technique is not far from the "Lancaster" tutorial method of teaching so popular in Eaton's day, but the latter was used only in the traditional curriculum and had been made a part of the sciences nowhere except in a rather different manner at Gardiner Lyceum where the students appear to have been individually instructed in the lab by the teacher and there expected to perform experiments for themselves.



12. Site of the Rensselaer School, 1825, in Troy, New York. (Courtesy Rensselaer Polytechnic Institute.)

Eaton and Rensselaer claimed and received a broad reputation for having first begun such a technique. The magnitude of this innovation should not be exaggerated pedagogically speaking, however, since many border-line cases may be cited. The most significant objection to Eaton's originality was voiced by the American Journal of Education in 1827:

It is not within any design to detract from its merits that we would attempt to correct the statements which involve a claim to originality in the method of instruction adopted in this school. [Rensselaer] As matter of fact, however, connected with our duty of presenting, as far as possible, a full and fair history of education, it is but justice to one eminent reformer in education, who has now left the field of labor which he occupied so long and so usefully* to state that the plan of instructing which devolves the duty of lecturing, reading or conversing, chiefly or wholly, on the pupil himself, rather than on the instructor, was employed nearly half a century ago, in the daily exercises of the first philosophy class in the University of Glasgow; and that emanating from that truly practical institution, it has now found its way into several, if not most, of the mechanics' institutes.¹⁶

*Professor Jardine

In that same year Eaton wrote

The unwillingness to admit the possibility of an American improvement in the course of education which generally prevails and the universal homage paid to everything European, has caused much effort to trace the Rensselaerean plan to some supposed shade of it on the other side of the Atlantic... The method of teaching by lectures is original....¹⁷

The problem is probably best left here.

¹⁶Loc. cit., II (1827), 413.

¹⁷McAllister, op. cit., p. 390.

The Early Years

During the first decade of the school's operation never more than twenty-five pupils were accepted due to the limitations inherent in the manner of instruction. Nevertheless, the school, between 1826 and 1834, "conferred the traditional academic degrees of bachelor of arts and master of arts."¹⁸ In 1835, however, it conferred the first degree in science and engineering. That Gardiner Lyceum in Maine was granting degrees at the same time should be kept in mind although which school granted the first degree in "engineering" is not clear, nor for that matter of much importance.

Annual tours were introduced in 1826 whereby the class of about twenty students was placed on a boat and taken on a geological tour along the canal line. In 1830 Eaton began to give lectures to the citizens of Troy on "Technology," and in 1831 he began a series on chemistry entitled "To Medical Students." In 1833 the name of the school was changed to "Rensselaer Institute" and in 1850 it was changed again to "Rensselaer Polytechnic Institute," the name by which it is today known.

Religion and the School

No religion was taught at Rensselaer. Because of the design of the school, religion was never considered as being appropriate to the curriculum. Yet a liberal brand of Christianity was ever-present in Eaton's life and works. His biographer reports he was "a student

¹⁸Rensselaer Polytechnic Institute. Bulletin for 1961-1962 (1961), p. 7.

of the Bible"; he selected Presbyterian ministers to serve as presidents of the school since his own tastes were turned to Presbyterianism, the religion of his parents. Records show that Amos Eaton was never a member of any church but he did grow concerned about rumors that his absence was due to infidelity and wrote to the local pastor expressing sympathy with the Church and asking advice on his becoming a member considering his prison background. The answer to his inquiry is not recorded.

The impact of religious controversy over the origin and evolution of the earth did leave its mark on Eaton's theology, however, and he attempted, as did Silliman at Yale, to reconcile the Genesis with the geology of Hutton and Werner. The following quasi-Deistic statement made by Eaton in 1828 probably reflects a view somewhat more liberal than most Presbyterians could have accepted:

I do not now feel bound to prove that the Koran of Mahomet or the Veda of the Bramine, are sacred books as it respects the believers in them. God suffers them to believe their revelation as he does us ours. If we obey the religion which is permitted to be believed, we shall do well.¹⁹

The School's Influence on Technology

Graduates from Rensselaer had been intended to serve to bring technology about agriculture and the arts to the farmer and mechanic in such a manner as they might conduct their businesses in an enlightened and scientific manner. This objective was certainly not achieved

¹⁹ McAllister, op. cit., p. 68.

in any direct or immediate way. Early graduates, says H. G. Good,

became distinguished scientists and did not devote themselves to rural school and agricultural improvement. As state geologists, agricultural chemists, and founders of agricultural experiment stations, their work ultimately aided the farmer, but directly the rural school benefited little.²⁰

Later graduates of the school distinguished themselves fully as much as the early ones. Among the engineers who attended Rensselaer we find the inventor of the Thacher slide rule; the builder of the Brooklyn Bridge; the designer of the Ferris Wheel and perhaps "three fourths of all the famous bridge builders of the nineteenth century."²¹

Cultural and Philosophical Influences on Eaton

Strongest of the many influences on Eaton was his dedication to the principles upon which the United States of America was founded. He had a life-long interest in bringing applied science to the common man. He refused to recognize at any time the existence of social strata even though the existing social order forced him into heavy dependence on Van Rensselaer. Eaton was a student of the new science and the new education. Politically he was a Federalist although inactive. Intensely nationalistic, he had received a practical bent from his blacksmith days as a boy. His early interest in surveying and botany showed a strong tendency to scientific work. His classical education gave him the poise

²⁰H. G. Good, A History of Western Education, second edition (New York: Macmillan Co., 1960), p. 407.

²¹Time, IV (1924), Oct. 13, p. 18.

and respectability, the depth of learning and confidence necessary to enter upon numerous contributions to science. He reflected in many respects the progressive idealism of the formative years in America. When prison broke up his law career, he turned to his second choice--that of science. He was unable to break into the University teaching circle, probably due to his record as an ex-convict, and thus, turned to traveling, lecturing, and writing elementary text books and manuals. Finally, he founded a school of his own where he set himself up in an institution so as to be productive and gain recognition.

The great mass of mankind have neither the liking, nor the aptitude, for either literary, or scientific, or artistic pursuits; nor, indeed, for excellence of any sort. Their ambition is to go through life with moderate exertion and a fair share of ease, doing common things in a common way. And a great blessing and comfort it is that the majority of men are of this mind; for the majority of things to be done are common things, and are quite well enough done when commonly done.

--T. H. Huxley
"Technical Education,"
Fortnightly Review, XXIII,
N. S. (1878), pp. 56-57.

CHAPTER XIII

SUMMARY AND CONCLUSIONS

General

Technology entered the curriculum for American students in January of 1823 at Gardiner Lyceum in Maine. This was followed closely by Josiah Holbrook at Derby in Connecticut in 1824 at his "Agricultural Seminary"; by Amos Eaton at Rensselaer in 1825; and by all those involved in the New Harmony experiment in 1826. While each of these schools was influenced by the utopian school created by Philipp Emanuel von Fellenberg in Switzerland in 1810, each was also related to the rising emphasis on science "for the common purposes of life"--an outgrowth of the scientific revolution.

A quasi-technical course of study was pursued in South Carolina in 1797 at Howe's school for orphans and the poor; at West Point in 1802; at Readfield, Maine, in 1822; and at the University of Virginia in 1825. By 1826 the movement had spread broadly.

The Terminology

The concepts of professional, career, and vocational education were, at best, poorly formed during the time span covered in this study. The terms "vocational" and "education" were not used together even though the activity we now associate with those terms was indeed present.

Considerable difficulty results when attempting to compare institutions whose founders voiced the same philosophy of education but applied it at opposite extremes of the school age group. At New Harmony in 1826 the elementary school as well as the secondary school was vocational; and at Gardiner Lyceum in 1823 the high school was definitely vocational in character. Simultaneously, Gardiner was doing college level teaching of a technical sort. At Derby in Connecticut, Holbrook's Seminary of 1824 seems to have been pitched at the secondary level while Rensselaer School was directed at University graduates and some under-graduates. This problem, unfortunately, has by no means been solved by the twentieth century. It is a fine line that separates vocational from professional education. To further complicate the matter the line between professional and liberal education is quite as arbitrary. Perhaps there is developing a "third culture": the humanists, the scientists, and the technologists!

Division into Schools

After the first trials, the social stigma attached to manual labor split the philosophy into two regions. One of these was industrial schools and agricultural schools for young orphans and delinquents. The Boston Asylum and Farm School is a good example. The second was a demanding, rather high level, professional education in mechanical and agricultural sciences. The latter became so much in demand that it grew into the Land-Grant institutions. Although a clear bias exists toward the utilitarian today, these have diversified so that most of them offer a broad base of studies. When the

professional character of the Land-Grant offering proved unable to significantly reach rural populations, three more basic moves were made to fill the void: (1) development of the Agricultural Experiment Stations in the 1880's; (2) creation of the Agricultural Extension Service in 1914; and (3) passage of the Smith-Hughes bill in 1917. The first of these was designed to produce agricultural knowledge, the second was designed to carry this knowledge into the villages, and the third was to make industrial and agricultural subjects a part of public secondary education.

Thus, as American thought took shape during and after the Revolution, so did the trends in American education become the logical outcomes of those views. At the same time that America became a nation, agriculture underwent a revolution and became, almost, a science. Meanwhile, Rousseau, Pestalozzi and Fellenberg were creating a new education, and the French Revolution was focusing attention on the common man. A hedonistic ethic and the "New Philosophy" were beamed together and brought into sharp focus upon technology in educational reform. "Useful knowledge," "practical science," was put into the traditional curriculum at all levels. And at all levels it has since increased.

About the Origins

One may trace various colors of career education as far back as is wished--even to early Egypt. But a more meaningful picture emerges if we establish the early sixteenth century as its beginning. Philosophers toyed with the idea of vocational education, but prior to the

nineteenth century these were exceptions rather than the rule. The intellectual climate was decidedly against it.

As the American dream changed from a daring experiment into a feasibility, education was bound to undergo radical changes. Many of these centered about agriculture not so much because it was a science, as that it was the primary vocation of Americans. Although the prospects of the industrial revolution caused serious interest in the "mechanical" aspects of technology, the one movement cannot truly be said to have had greater influence than the other.

By 1830 so many attempts were being made at the teaching of these two subjects that considerable research will be necessary to trace influences from that time up through the next thirty years. I have documented in the course of study about seventy-five schools founded between 1820 and 1835 in which a significant role was given to agricultural and mechanical subjects either through the "manual labor" movement or the trend to useful knowledge.

Subsequent Events

On the surface, educational interest in technology seems to fade about 1840 but this view is probably false. At any rate it reappears occasionally in the 1840's. The Michigan Constitution of 1850 provided for the establishment of an agricultural school and the legislature of Michigan petitioned Congress for a grant of public land to found a college of agriculture, which was seconded in 1854 by Illinois. The State of Virginia listed a state agricultural school as one of its needs in 1857 in its "Address to the People," and in

1859 Pennsylvania opened its agricultural school as Michigan had done in 1857. In 1856 Congress ordered an investigation of the idea of such schools, and in 1859 Justin P. Morrill of Vermont sponsored the first version of the Land-Grant Act.

Some Other General Points

An interesting correlation has been noticed between the secularization and industrialization of the curriculum. The popular assumption that technology has driven back religion is not substantiated; on the contrary, where technology is emphasized for its own sake, where useful knowledge and practical science are championed as such, these are preceded, not followed or accompanied, by a falling away of religious interest and fervor in the orthodox sense. Every school presented in this study, excluding perhaps the Howe school, seems to have been involved in some religious bitterness either because it was not teaching enough dogma or because the founders and teachers were themselves heretics. This theme of conflict between the best interests of science and the best interests of orthodox religion is even yet a matter of serious discussion among many. The extent and character of friction is largely arrived at subjectively, and deserves to be more thoroughly documented. It has been popular to assume that no serious conflicts arise between scientists and lay people concerning religions. Often men like Benjamin Silliman are pointed to as examples of the American tradition in science and religion. The truth is that Silliman was a precocious child, a verbose gentleman and a Christian orator. He made not a single scientific discovery--

his only contributions to the scientific community being the popularization of mineralogy and chemistry through lectures at Yale and the editing of the American Journal of Science. Meanwhile, men like Joseph Priestley and Thomas Cooper, who were experimenting, creative scientists, actively evolving theoretical constructions, were involved in numerous political and religious controversies. Both were known for their unusually liberal views on religion. Cooper was removed from the bench in 1811, forced to resign (1) at Dickinson College in 1812, (2) at the College of Philadelphia in 1818, (3) at the University of Virginia in 1821, and (4) at the College of South Carolina in 1834--all for his criticism of traditional religion. A virtual Bertrand Russell of early American science! A biography is surely needed.¹

A study published in 1963 by Lewis S. Feuer entitled The Scientific Intellectual documented his thesis that in general the scientific movement has been based on a hedonist-libertarian ethic. "The Scientific intellectual was neither a Protestant ascetic, as Robert K. Merton would have it, nor a 'sleepwalker,' as Arthur Koestler would tell us. Rather, he was a person for whom science was a 'new philosophy,' a third force rising above religious and political hatreds, seeking the world of nature with liberated vision and intending to use and enjoy its knowledge." In the schools studied, this attitude is

¹The best biographical sketch of Thomas Cooper's life is Bernard Jaffe, Men of Science (New York: Simon and Schuster, 1958), pp. 78-103.

present in varying degrees, stronger in some than in others, but always obvious and influential. The men who founded the early scientific schools were not always best described as "scientific intellectuals" but they were invariably linked with the new philosophy and always they saw their science as the instrument for the alleviation of human ills.

Another area of interest concerns the light thrown by this study upon the movement toward what we today look back on as "Progressive Education." Even the most conservative historian must confess that technology has been given a comparatively small space in educational history before 1900. The evidence presented in this report lays claim to a more seminal position for technology. Careful study, particularly in the years 1830 to 1876, will be necessary in this respect.

Additional promising biographies include those of Joseph Neef, William Maclure, Jacob Bigelow (who in 1829 originated the term "technology") and Count Rumford (Benjamin Thompson). The lives of Benjamin Hale and Benjamin Vaughan should both provide excellent useful insights into the history of education as well as of American science.

Gardiner Lyceum

A dissertation-length study seems to be merited in connection with the Gardiner Lyceum. This writer is not satisfied with the history of this institution as it now stands but added research should clear up the problem. What role did Vaughan play in the school? What was the role of Hale? Who were the other faculty members and what were their subsequent careers? What did Gardiner graduates contribute

to the industrial revolution? Was Robert Hallowell Gardiner truly the philosophical force behind the Lyceum or was his role more like that of Stephen Van Rensselaer at the Rensselaer School? These questions need answers if we are to understand the sociological impact of the early work.

Miscellaneous

The complete dedication of gentlemen farmers to the proposition that agriculture would be radically transformed by the scientific studies of their day seems to have been grossly unjustified. Also, their conviction that agriculture would progress rapidly upon the discoveries in chemistry merits more careful attention.

Much work needs to be done in establishing the social effects of the early schools and of their graduates. We know little of Holbrook's students, or of any other school's graduates except a few from Rensselaer, West Point, and the University of Virginia.

The problems encountered in constructing a broad picture indicate without doubt that an international study of the development of agricultural education in the Western World would have much bearing on the present day economic problems across both East and West.

Some Limitations

As this study has been more introductory than exhaustive, the treatment of individual topics is regrettably inadequate. In every case an attempt has been made to establish the general philosophical attitudes within which the activities took place. For example, during

the first twenty-five years of the Republic, gentlemen farmers' motivations seem to have been scientific in a "pure" category, but it is certain that by 1820 the new force, technology in agriculture and mechanics, was making its appearance in leading circles. Utilitarian science almost entirely supplanted theoretical science in the next twenty years.

An additional limitation is recognized in the difficulty encountered in evaluating the effect of all this on the "dirt" farmer. It seems probable that the educational ferment of the intelligentsia hardly touched the periphery of the great farm masses. Even Arthur Young said of agricultural societies, "...they meet, converse, offer premiums, and publish nonsense. This is not much consequence, for the people, instead of reading their memoirs, are not able to read at all." There were pamphlets in abundance. No one knows how representative the surviving works are. Rural day-laborers, tenant farmers and farm owners rarely read any books other than the Bible, almanacs, pamphlets, and an occasional periodical. Some authors report the farmer to have been a hindrance rather than a help in the battle for education. There is some truth in the statement that they were suspicious of "book-farming," city people, and "arm-chair editors."

On the mechanical side, the "Mechanics Associations" began to rise and play a part in the mid-twenties and early thirties. Their story should be told.

Higher Education

The university faculties largely accepted without question the social order which made their training a class privilege. "Practical" courses were slow to enter colleges as the latter were to train "leaders" and "intellects" that could adapt to any vocation. University faculties were conservative, and often rightly so. They knew there was an important difference in a subject for study and a subject to be taught in the nineteenth century classroom. The change was not simply one of adding technology to the curriculum but of a vast metamorphosis of teaching and learning. This procedure was necessarily slow. But, for better or for worse the general drift of American education since the Declaration of Independence has been away from the "leisure class" and toward the layman.

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Agricultural Education

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The Land-Grant Institutions

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found in William Belmont Parker: The Life and Services of Justin Smith Morrill (1924). Any scholar preparing to study the agricultural and mechanical colleges should read the work by Edmund J. James: The Origin of the Land Grant Act of 1862 (1910). James demonstrates a severe lack of perspective in attributing virtually the entire movement to a single professor.

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Other works of importance include Paul H. Douglas: American Apprenticeship and Industrial Education (1921) and F. Theodore Struck: Foundations of Industrial Education (1930). The student of manual and industrial education will find the Bibliography of Industrial, Vocational and Trade Education (1913) prepared by Henry R. Evans for the U. S. Office of Education a valuable resource. Lawrence A. Cremin's "Bibliographical Note" appended to The Transformation of the School (1961) is the best guide published concerning American educational history and his remarks on "Popular Education" and "Education and Industry" are of enduring significance.

The History of Technology

Much excitement has been generated during the last six or seven years concerning the history of technology. The best journal is by the Society for the History of Technology: Technology and Culture. A general consideration of the impact of technology on society is Francis R. Allen, Hornell Hart, Delbert C. Miller, William F. Ogburn, and Meyer F. Nimkoff: Technology and Social Change (1957), but an earlier work by Jesse E. Thornton: Science and Social Change (1939)

is also helpful. The best general history of technology is Charles Singer, E. J. Holmyard, A. R. Hall, and Trevor I. Williams: A History of Technology (1958). Many useful chapters are to be found in A. Wolf's A History of Science, Technology and Philosophy in the Sixteenth and Seventeenth Centuries (1950) and A History of Science, Technology and Philosophy in the Eighteenth Century (1938). Both works have been reprinted as Harper Torchbooks (1959 and 1961). John R. Commons, et. al.: A Documentary History of American Industrial Society (eleven volumes, 1910-1911) is a general reference for serious students.

By far the most significant treatise on the scientific personality is Lewis S. Feuer, The Scientific Intellectual: The Psychological and Sociological Origins of Modern Science (1963) although a number of other treatments of a less comprehensive nature are available.

Progressive American Ideology

There are five important works which treat upon American aspirations from the historical view. The first of these, and perhaps the most important is A. F. Tyler: Freedom's Ferment: Phases of American Social History to 1860 (1944). Others are V. L. Parrington: American Dreams: A Study of American Utopias (1947); A. E. Bestor: Backwoods Utopias: The Sectarian and Owenite Phases of Communitarian Socialism in America: 1663-1829 (1950); A. A. Ekirch: The Idea of Progress in America, 1815-1860 (1951) and recently, Stewart H. Holbrook: Dreamers of the American Dream (1957). Thorstein Veblen's classic of American thought, The Theory of the Leisure Class, is mostly superseded now but should be required reading for students taking degrees in vocational education.

There have been two periods in American history when "liberalism" exerted determinant effects on education. The era of "progressive" education is one; the other was the period from the middle of the eighteenth century until about 1800. Allen O. Hansen, in his book Liberalism and American Education in the Eighteenth Century does for the earlier period what Cremin did for progressivism.

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VITA

Thomas K. Shotwell was born May 31, 1934 in Hillsboro, Texas. He attended the public schools in that city and was graduated from the high school in 1951. In 1951 he enrolled in Tarleton State College at Stephenville, Texas and received the degree of Associate in Science in 1953. He transferred to Texas A & M University and in 1955 completed the requirements for a Bachelor of Science in Agricultural Education.

During 1955 and 1956 he served with the Agricultural Extension Service in the capacity of Assistant County Agricultural Agent for Van Zandt County. After two years of military service he entered the Graduate School at Texas A & M University where he received the degree of Master of Education in 1959. From 1958 to 1962 he taught at the Allen Military Academy and Junior College at Bryan, Texas. In the Fall of 1962 he entered the Graduate School of Louisiana State University where he served as a Graduate Assistant until returning to the Allen Junior College in 1963.

He is the author of a number of articles for professional magazines as well as a student laboratory guide in botany published by the Allen Junior College in 1964.

He is married to the former Shirley Imogene Plunkett of Hillsboro, Texas. They have one child, Sharon Kay, age four.

EXAMINATION AND THESIS REPORT

Candidate: Thomas Knight Shotwell

Major Field: Vocational Agricultural Education

Title of Thesis: Technology and Educational Reform in Early America

Approved:

Charles M. Curtis

Major Professor and Chairman

Max Goodrich

Dean of the Graduate School

EXAMINING COMMITTEE:

James Hutchinson

Anthony Murphy

Edward W. Gassie

Wm. W. Manday

Date of Examination:

July 1, 1965